MHI

TECHNICAL MANUAL
Collection data

Manual No. '06 • SCM-T-052

INVERTER MULTI-SPLIT SYSTEM ROOM AIR-CONDITIONER

(Air to air heat pump type)

(Outdoor unit)

SCM40ZF-S	SCM45ZF-S	SCM48ZF-S
SCM60ZF-S	SCM80ZF-S	

(Indoor unit)

SKM20ZF-S	STM25ZF-S	SRRM25ZF-S
SKM22ZF-S	STM35ZF-S	SRRM35ZF-S
SKM25ZF-S	STM50ZF-S	SRRM50ZF-S
SKM28ZF-S	STM60ZF-S	SRRM60ZF-S
SKM35ZF-S		
SKM50ZF-S		

MITSUBISHI HEAVY INDUSTRIES, LTD.

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1 GENERAL INFORMATION

1.1 Specific features

(1) The long piping makes the location of the inside and units flexible.

- No need for additional charge of refrigerant : 40 type · 30m, 45 type · 20m, 48 type · 40m, 60 type · 30m, 80 type · 40m
- Maximum piping length : 40 type · 30m, 45 type · 30m, 48 type · 40m, 60 type · 40m, 80 type · 70m

(2) Connectable indoor capacity

Number of connectable units : 40 type · 2 units, 45 type · 2 units, 48 type · 3 units, 60 type · 3 units, 80 type · 4 units

Total of indoor units (class kW) : 40 type · 5.6 kW, 45 type · 7.0 kW, 48 type · 8.5 kW, 60 type · 11.0 kW, 80 type · 13.5 kW

(3) Indoor units are available with 7 capacities.

7 capacities 20, 22, 25, 28, 35, 50, 60

Types ..... Wall mounted type (SKM).
4-way ceiling cassette type (STM).
Ducted type (SRRM).

(4) Inverter (Frequency converter) for multi-steps power control

- Heating / Cooling

  The rotational speed of a compressor is changed in step in relation to varying load, to interlock with the indoor and outdoor unit fans controlled to changes in frequency, thus controlling the power.
- Allowing quick heating/cooling operation during start-up period. Constant room temperature by fine-tuned control after the unit has stabilized.

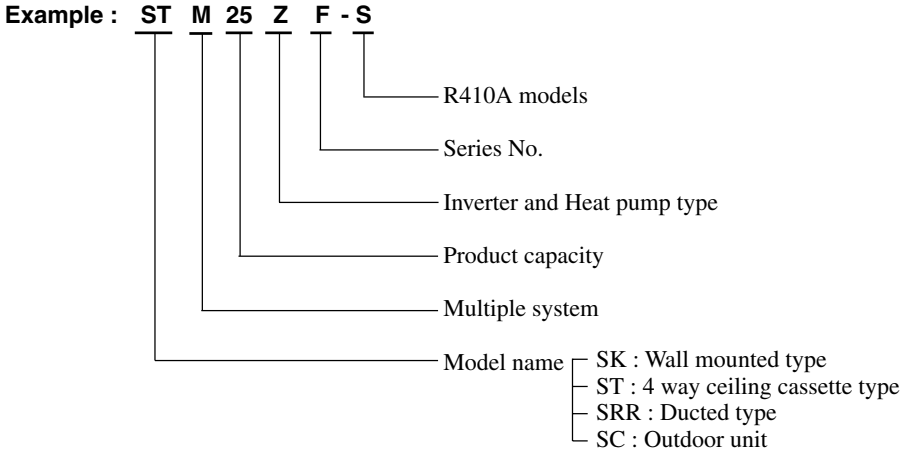
(5) Fuzzy control

Fuzzy control calculates the amount of variation in the difference between the suction air temperature and the setting temperature in compliance with the fuzzy rules in order to control the air capacity and the inverter frequency.

(6) Self diagnosis function

We are constantly trying to do better service to our customers by installing such judges that show abnormality of operation as follows. (See page 95)

1.2 How to read the model name


Example : ST M 25 Z F - S
R410A models
Series No.
Inverter and Heat pump type
Product capacity
Multiple system
Model name
SK : Wall mounted type
ST : 4 way ceiling cassette type
SRR : Ducted type
SC : Outdoor unit

2 SELECTION DATA

2.1 Specifications

(1) Indoor unit

Models SKM20ZF-S, 22ZF-S, 25ZF-S

Item \ Models					SKM20ZF-S	SKM22ZF-S	SKM25ZF-S
Cooling capacity				W	2000	2200	2500
Heating capacity				W	3000	3200	3400
Noise level	Cooling	Sound level		dB	Hi : 37 Me : 30 Lo : 23		
		Power level			Hi : 53		
	Heating	Sound level			Hi : 39 Me : 33 Lo : 27		
		Power level			Hi : 55		
Exterior dimensions Height × Width × Depth				mm	250 × 815 × 249		
Color					Cool white		
Net weight				kg	9.0		
Air handling equipment Fan type & Q'ty					Tangential fan × 1		
Motor				W	16		
Air flow (at high)			Cooling	CMM	8.0		
			Heating		8.7		
Air filter, Q'ty					Polypropylene net × 2 (Washable)		
Operation switch					Wireless-Remote control		
Room temperature control					Microcomputer thermostat		
Pilot lamp					RUN (Green), TIMER (Yellow), HI POWER (Green), ECONO (Orange)		
Safety equipment					Frost protection, Serial error protection Fan motor error protection		
Refrigerant piping	O.D		Liquid line	mm (in)	ϕ 6.35 (1/4″)		
			Gas line		ϕ 9.52 (3/8″)		
	Connecting method				Flare connecting		
	Attached length of piping				Liquid line : 0.4m Gas line : 0.33m		
	Insulation				Necessary (Both Liquid & Gas lines)		
Drain hose					Connectable		
Accessories (including)					Mounting kit, Clean filter (Natural enzyme filter × 1, Photocatalytic washable deodorizing filter × 1)		
Optional parts					—		
Outdoor unit to be combined					SCM40, 45, 48, 60, 80ZF-S		

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) Capacity indicated is the rated capacity with one unit operating under ISO-T1 standards conditions.

Models SKM28ZF-S, 35ZF-S, 50ZF-S,

Item \ Model					SKM28ZF-S	SKM35ZF-S	SKM50ZF-S
Cooling capacity				W	2800	3500	5000
Heating capacity				W	4000	4500	5800
Noise level	Cooling	Sound level		dB	Hi : 38 Me : 31 Lo : 24	Hi : 39 Me : 32 Lo : 25	Hi : 47 Me : 36 Lo : 23
		Power level			Hi : 54	Hi : 55	Hi : 62
	Heating	Sound level			Hi : 40 Me : 34 Lo : 28	Hi : 41 Me : 35 Lo : 29	Hi : 48 Me : 37 Lo : 27
		Power level			Hi : 56	Hi : 57	Hi : 63
Exterior dimensions Height × Width × Depth				mm	250 × 815 × 249		
Color					Cool white		
Net weight				kg	9.0		9.5
Air handling equipment Fan type & Q'ty					Tangential fan × 1		
Motor				W	16		29
Air flow (at high)			Cooling	CMM	8.2	8.4	11
			Heating		9.0	9.2	13.9
Air filter, Q'ty					Polypropylene net × 2 (Washable)		
Operation switch					Wireless-Remote control		
Room temperature control					Microcomputer thermostat		
Pilot lamp					RUN (Green), TIMER (Yellow), HI POWER (Green), ECONO (Orange)		
Safety equipment					Frost protection, Serial error protection Fan moter error protection		
Refrigerant piping	O.D	Liquid line		mm (in)	ϕ 6.35 (1/4″)		
		Gas line			ϕ 9.52 (3/8″)		ϕ 12.7 (1/2″)
	Connecting method				Flare connecting		
	Attached length of piping				Liquid line : 0.4m Gas line : 0.33m		
	Insulation				Necessary (Both Liquid & Gas lines)		
Drain hose					Connectable		
Accessories (including)					Mounting kit, Clean filter (Natural enzyme filter × 1, Photocatalytic washable deodorizing filter × 1)		
Optional parts					—		
Outdoor unit to be combined					SCM40, 45, 48, 60, 80ZF-S	SCM45, 48, 60, 80ZF-S	SCM60, 80ZF-S

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) Capacity indicated is the rated capacity with one unit operating under ISO-T1 standards conditions.

Models STM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S

Item \ Models				STM25ZF-S	STM35ZF-S	STM50ZF-S	STM60ZF-S
Cooling capacity			W	2500	3500	5000	6000
Heating capacity			W	3400	4500	5800	6800
Noise level	Cooling	Sound level	dB	35	38	40	47
		Power level		51	54	56	63
	Heating	Sound level		35	38	40	47
		Power level		51	54	56	63
Exterior dimensions Height × Width × Depth		Main unit	mm	248 × 570 × 570			
		Panel		35 × 700 × 700			
Color				—			
Net weight		Main unit	kg	14		14.5	
		Panel		3.5			
Air handling equipment Fan type & Q'ty				Turbo fan × 1			
Motor			W	40			
Air flow (at high)		Cooling	CMM	8.0	9.0	10.0	13.0
		Heating		9.0	10.0	11.0	14.0
Air filter, Q'ty				Long life filter × 1 (Washable)			
Operation switch				Wireless-Remote control			
Room temperature control				Microcomputer thermostat			
Pilot lamp				RUN (Green), TIMER (Yellow), HI POWER (Green), ECONO (Orange)			
Safety equipment				Frost protection, Serial error protection Fan motor error protection, Drain error protection			
Refrigerant piping	O.D	Liquid line	mm (in)	ϕ 6.35 (1/4″)			
		Gas line		ϕ 9.52 (3/8″)		ϕ 12.7 (1/2″)	
	Connecting method			Flare connecting			
	Attached length of piping			—			
	Insulation			Necessary (Both Liquid & Gas lines)			
Drain hose				Connectable			
Accessories (including)				Mounting kit			
Optional parts				Wired remote control			
Outdoor unit to be combined				SCM40, 45, 48, 60, 80ZF-S	SCM45, 48, 60, 80ZF-S	SCM60, 80ZF-S	

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) Capacity indicated is the rated capacity with one unit operating under ISO-T1 standards conditions.

Models SRRM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S

Item \ Models					SRRM25ZF-S	SRRM35ZF-S	SRRM50ZF-S	SRRM60ZF-S
Cooling capacity				W	2500	3500	5000	6000
Heating capacity				W	3400	4500	5800	6800
Noise level	Cooling	Sound level		dB	38	40	46	49
		Power level			53	55	60	63
	Heating	Sound level			39	41	46	49
		Power level			54	56	60	63
Exterior dimensions Height × Width × Depth				mm	230 × 740 × 455			
Color					—			
Net weight				kg	22.0		23.0	
Air handling equipment Fan type & Q'ty					Centrifugal fan × 2			
Motor				W	51			
Air flow (at high)			Cooling	CMM	8.5	9.0	10.5	12.5
			Heating		10.0	11.0	13.0	15.0
Air filter, Q'ty					Polypropylene net× 1			
Operation switch					Wireless-Remote control			
Room temperature control					Microcomputer thermostat			
Pilot lamp					RUN (Green), TIMER (Yellow), HI POWER (Green), ECONO (Orange)			
Safety equipment					Frost protection, Serial error protection Fan motor error protection, Drain error protection			
Refrigerant piping	O.D		Liquid line	mm (in)	ϕ 6.35 (1/4″)			
			Gas line		ϕ 9.52 (3/8″)		ϕ 12.7 (1/2″)	
	Connecting method				Flare connecting			
	Attached length of piping				—			
	Insulation				Necessary (Both Liquid & Gas lines)			
Drain hose					Connectable			
Accessories (including)					Mounting kit			
Optional parts					Wired remote control			
Outdoor unit to be combined					SCM40, 45, 48, 60, 80ZF-S	SCM45, 48, 60, 80ZF-S	SCM60, 80ZF-S	

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) Capacity indicated is the rated capacity with one unit operating under ISO-T1 standards conditions.

(2) Outdoor unit

Models SCM40ZF-S, 45ZF-S

Item \ Models				SCM40ZF-S	SCM45ZF-S
Cooling capacity			W	4000 (1900 ~ 4900)	4500 (700 ~ 5600)
Heating capacity			W	5000 (1300 ~ 5200)	5600 (700 ~ 6800)
Power source				1 Phase 220/230/240V 50Hz	
Power consumption		Cooling	W	970 (470 ~ 1470)	1390 (200 ~ 2160)
		Heating		1150 (450 ~ 1260)	1540 (200 ~ 2340)
Running current		Cooling	A	4.5/4.3/4.1	6.4/6.1/5.9
		Heating		5.3/5.1/4.8	7.1/6.8/6.5
Noise level		Sound level	dB	Cooling : 45 Heating : 47	Cooling : 45 Heating : 47
		Power level		Cooling : 60 Heating : 62	Cooling : 60 Heating : 62
Exterior dimensions Height × Width × Depth			mm	640 × 850 × 290	
Color				Stucco white	
Net weight			kg	43	44
Refrigerant equipment Compressor type & Q'ty				[Rotary] × 1	[Scroll] × 1
Motor			kW	0.7	0.7
Starting method				Direct start	
Refrigerant control				Capillary tubes + Electric expansion valve	
Refrigerant			kg	R410A 1.4 (Pre-charged up to the piping length of 30m)	R410A 1.6 (Pre-charged up to the piping length of 20m)
Refrigerant oil			ℓ	0.32 (RB68A)	0.48 (RB68A)
Air handling equipment Fan type & Q'ty				Propeller fan × 1	
Motor			W	34	
Air flow (at high)			CMM	40	
Shock & vibration absorber				Rubber (for compressor)	
Safety equipment				Compressor overheat protection, Overcurrent protection Serial signal error protection	
Refrigerant piping	Size × Core × Number		mm (in)	Liquid line: ϕ 6.35 (1/4″) × 2	
				Gas line: ϕ 9.52 (3/8″) × 2	
	Connecting method			Flare connecting	
	Attached length piping			—	
	Insulation			Necessary (Both Liquid & Gas lines)	
Power source supply				Terminal block (Screw fixing type)	
Connection wiring	Size × Core number			1.5 mm² × 4 cores (Including earth cable) × 2	
	Connecting method			Terminal block (Screw fixing type)	
Accessories (included)				Installation sheet, Manual instruction	
Indoor units to be combined				SKM20, 22, 25, 28 type, STM25 type, SRRM25 type	SKM20, 22, 25, 28, 35 type, STM25, 35 type, SRRM25, 35 type

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) The values for capacity and power consumption shown in a range ( ) indicate the minimum and maximum of the range.

(3) The refrigerant quantity to be charged includes the refrigerant in 30 m connecting piping. (SCM40ZF-S)

(4) If the piping length exceeds 20 m, additional charging is required. (20g/m, SCM45ZF-S)

Models SCM48ZF-S, 60ZF-S

Item \ Models			SCM48ZF-S	SCM60ZF-S
Cooling capacity		W	4800 (1100~6700)	6000 (1400~6900)
Heating capacity		W	6000 (780~7100)	7000 (750~7200)
Power source			1 Phase 220/230/240V 50Hz	
Power consumption	Cooling	W	1190 (200~2340)	1860 (400~3000)
	Heating		1380 (200~2180)	1740 (320~2700)
Running current	Cooling	A	5.2/5.2/5.0	8.5/8.2/7.8
	Heating		6.3/6.1/5.8	8.0/7.6/7.3
Noise level	Sound level	dB	Cooling : 48 Heating : 49	Cooling : 48 Heating : 50
	Power level		Cooling : 63 Heating : 64	Cooling : 63 Heating : 65
Exterior dimensions Height × Width × Depth		mm	640 × 850 × 290	
Color			Stucco white	
Net weight		kg	46	51
Refrigerant equipment Compressor type & Q'ty			[Scroll] × 1	[Twin rotary] × 1
Motor		kW	0.7	1.3
Starting method			Direct start	
Refrigerant control			Capillary tubes + Electronic expansion valve	
Refrigerant		kg	R410A 1.95 (Pre-charged up to the piping length of 40m)	R410A 2.2 (Pre-charged up to the piping length of 30m)
Refrigerant oil		ℓ	0.48 (RB68A)	0.67 (MEL56)
Air handling equipment Fan type & Q'ty			Propeller fan × 1	
Motor		W	34	
Air flow (at high)		CMM	42	
Shock & vibration absorber			Rubber (for compressor)	
Safety equipment			Compressor overheat protection, Overcurrent protection Serial signal error protection	
Refrigerant piping	Size × Core × Number	mm (in)	Liquid line: ϕ 6.35 (1/4″) × 3	
			Gas line: ϕ 9.52 (3/8″) × 3	
	Connecting method		Flare connecting	
	Attached length piping		—	
	Insulation		Necessary (Both Liquid & Gas lines)	
Power source supply			Terminal block (Screw fixing type)	
Connection wiring	Size × Core number		1.5 mm² × 4 cores (Including earth cable) × 3	
	Connecting method		Terminal block (Screw fixing type)	
Accessories (included)			Installation sheet, Manual instruction	Union : (ϕ 9.52 → ϕ 12.7) × 2 Installation sheet, Manual instruction
Indoor units to be combined			SKM20, 22, 25, 28, 35 type STM25, 35 type SRRM25, 35 type	SKM20, 22, 25, 28, 35, 50 type STM25, 35, 50, 60 type SRRM25, 35, 50, 60 type

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) The values for capacity and power consumption shown in a range ( ) indicate the minimum and maximum of the range.

(3) If the piping length exceeds 30 m, additional charging is required. (20g/m, SCM60ZF-S)

Model SCM80ZF-S

Item		Model	SCM80ZF-S
Cooling capacity		W	8000 (1000~9300)
Heating capacity		W	9300 (950~9500)
Power source			1 Phase 220/230/240V 50Hz
Power consumption	Cooling	W	2380 (280~3200)
	Heating		2430 (250~3500)
Running current	Cooling	A	10.9/10.5/10.0
	Heating		11.2/10.7/10.2
Noise level	Sound level	dB	Cooling : 51 Heating : 52
	Power level		Cooling : 65 Heating : 66
Exterior dimensions Height × Width × Depth		mm	750 × 880 × 340
Color			Stucco white
Net weight		kg	66
Refrigerant equipment Compressor type & Q'ty			[Twin rotary] × 1
Motor		kW	1.3
Starting method			Direct start
Refrigerant control			Capillary tubes + Electronic expansion valve
Refrigerant		kg	R410A 3.15 (Pre-charged up to the piping length of 40m)
Refrigerant oil		ℓ	0.67 (MEL56)
Air handling equipment Fan type & Q'ty			Propeller fan × 1
Motor		W	86
Air flow (at high)		CMM	55
Shock & vibration absorber			Rubber (for compressor)
Safety equipment			Compressor overheat protection, Overcurrent protection Serial signal error protection
Refrigerant piping	Size × Core × Number	mm (in)	Liquid line: ϕ 6.35 (1/4″) × 4
			Gas line: ϕ 9.52 (3/8″) × 4
	Connecting method		Flare connecting
	Attached length piping		—
	Insulation		Necessary (Both Liquid & Gas lines)
Power source supply			Terminal block (Screw fixing type)
Connection wiring	Size × Core number		1.5 mm² × 4 cores (Including earth cable) × 4
	Connecting method		Terminal block (Screw fixing type)
Accessories (included)			Union : (ϕ 9.52 → ϕ 12.7) × 2 Installation sheet, Manual instruction
Indoor unit to be combined			SKM20, 22, 25, 28, 35, 50 type STM25, 35, 50, 60 type SRRM25, 35, 50, 60 type

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS C9612
Heating	20°C	–	7°C	6°C	ISO-T1, JIS C9612

(2) The values for capacity and power consumption shown in a range ( ) indicate the minimum and maximum of the range.

(3) If the piping length exceeds 40 m, additional charging is required. (20g/m)

(3) Operation data

- The combinations of the indoor units is indicated by numbers. They are read as follows.
  (Example) SKM22ZF-S → 22 SKM35ZF-S → 35
- The capacity of the indoor units is shown by rooms. If this exceeds the maximum capacity of the outdoor unit, the demand capacity will be proportionally distributed.
- If units are to be combined, use the table below to make the proper selection.

Model SCM40ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)					Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)		Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	Min.	Standard	Max.						
1 room	20	3.0	–	1.3	3.0	3.9	450	770	1120	3.5	3.4	3.2
	22	3.2	–	1.3	3.2	4.0	450	790	1170	3.6	3.5	3.3
	25	3.4	–	1.3	3.4	4.1	450	900	1190	4.1	4.0	3.8
	28	4.0	–	1.3	4.0	4.2	450	1120	1250	5.1	4.9	4.7
2 room	20+20	2.50	2.50	2.4	5.0	5.2	450	1150	1260	5.3	5.1	4.8
	20+22	2.43	2.67	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	20+25	2.27	2.83	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	20+28	2.13	2.98	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	22+22	2.55	2.55	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	22+25	2.39	2.71	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	22+28	2.24	2.86	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	25+25	2.55	2.55	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	25+28	2.41	2.69	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1
	28+28	2.55	2.55	2.4	5.1	5.2	450	1210	1260	5.6	5.3	5.1

(b) Cooling

Indoor unit combination		Cooling capacity (kW)					Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)		Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	Min.	Standard	Max.						
1 room	20	2.0	–	1.9	2.0	2.4	470	480	620	2.2	2.1	2.0
	22	2.2	–	1.9	2.2	2.6	470	540	650	2.5	2.4	2.3
	25	2.5	–	1.9	2.5	2.7	470	640	660	2.9	2.8	2.7
	28	2.8	–	1.9	2.8	3.1	470	730	800	3.4	3.2	3.1
2 room	20+20	2.00	2.00	2.9	4.0	4.9	480	970	1470	4.5	4.3	4.1
	20+22	2.00	2.20	2.9	4.2	4.9	480	1070	1470	4.9	4.7	4.5
	20+25	2.00	2.50	2.9	4.5	4.9	480	1240	1470	5.7	5.4	5.2
	20+28	1.96	2.74	2.9	4.7	4.9	480	1390	1470	6.4	6.1	5.9
	22+22	2.20	2.20	2.9	4.4	4.9	480	1180	1470	5.4	5.2	5.0
	22+25	2.20	2.50	2.9	4.7	4.9	480	1350	1470	6.2	5.9	5.7
	22+28	2.11	2.69	2.9	4.8	4.9	480	1420	1470	6.5	6.2	6.0
	25+25	2.40	2.40	2.9	4.8	4.9	480	1420	1470	6.5	6.2	6.0
	25+28	2.26	2.54	2.9	4.8	4.9	480	1420	1470	6.5	6.2	6.0
	28+28	2.40	2.40	2.9	4.8	4.9	480	1420	1470	6.5	6.2	6.0

Model SCM45ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)					Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)		Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	Min.	Standard	Max.						
1 room	20	3.0	–	0.7	3.0	3.8	200	1050	1350	4.8	4.6	4.4
	22	3.2	–	0.7	3.2	3.9	200	1120	1380	5.1	4.9	4.7
	25	3.4	–	0.7	3.4	4.1	200	1190	1450	5.5	5.2	5.0
	28	4.0	–	0.7	4.0	4.3	200	1400	1520	6.4	6.1	5.9
	35	4.5	–	0.7	4.5	4.7	200	1590	1660	7.3	7.0	6.7
2 room	20+20	2.55	2.55	1.5	5.1	6.8	450	1380	2340	6.3	6.1	5.8
	20+22	2.48	2.72	1.5	5.2	6.8	450	1400	2340	6.4	6.1	5.9
	20+25	2.36	2.94	1.5	5.3	6.8	450	1430	2340	6.6	6.3	6.0
	20+28	2.29	3.21	1.5	5.5	6.8	450	1490	2340	6.8	6.5	6.3
	20+35	2.04	3.56	1.5	5.6	6.8	450	1540	2340	7.1	6.8	6.5
	22+22	2.65	2.65	1.5	5.3	6.8	450	1430	2340	6.6	6.3	6.0
	22+25	2.50	2.90	1.5	5.4	6.8	450	1460	2340	6.7	6.4	6.1
	22+28	2.40	3.10	1.5	5.5	6.8	450	1490	2340	6.8	6.5	6.3
	22+35	2.20	3.40	1.5	5.6	6.8	450	1540	2340	7.1	6.8	6.5
	25+25	2.75	2.75	1.5	5.5	6.8	450	1490	2340	6.8	6.5	6.3
	25+28	2.60	2.90	1.5	5.5	6.8	450	1490	2340	6.8	6.5	6.3
	25+35	2.40	3.30	1.5	5.7	6.8	450	1570	2340	7.2	6.9	6.6
	28+28	2.80	2.80	1.5	5.6	6.8	450	1540	2340	7.1	6.8	6.5
	28+35	2.60	3.20	1.5	5.8	6.8	450	1600	2340	7.3	7.0	6.7
	35+35	2.95	2.95	1.5	5.9	6.8	450	1630	2340	7.5	7.2	6.9

(b) Cooling

Indoor unit combination		Cooling capacity (kW)					Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)		Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	Min.	Standard	Max.						
1 room	20	2.0	–	0.7	2.0	2.4	200	620	750	2.8	2.7	2.6
	22	2.2	–	0.7	2.2	2.6	200	680	810	3.1	3.0	2.9
	25	2.5	–	0.7	2.5	2.7	200	760	840	3.5	3.3	3.2
	28	2.8	–	0.7	2.8	3.0	200	880	950	4.0	3.9	3.7
	35	3.5	–	0.7	3.5	3.6	200	1200	1250	5.5	5.3	5.1
2 room	20+20	2.00	2.00	1.4	4.0	4.8	420	1240	1700	5.7	5.4	5.2
	20+22	2.00	2.20	1.4	4.2	4.9	420	1300	1730	6.0	5.7	5.5
	20+25	1.91	2.39	1.4	4.3	5.1	420	1330	1800	6.1	5.8	5.6
	20+28	1.83	2.57	1.4	4.4	5.2	420	1360	1820	6.2	6.0	5.7
	20+35	1.64	2.86	1.4	4.5	5.6	420	1390	2160	6.4	6.1	5.9
	22+22	2.15	2.15	1.4	4.3	5.0	420	1330	1780	6.1	5.8	5.6
	22+25	2.00	2.30	1.4	4.3	5.1	420	1330	1800	6.1	5.8	5.6
	22+28	1.90	2.60	1.4	4.4	5.2	420	1360	1820	6.2	6.0	5.7
	22+35	1.70	2.80	1.4	4.5	5.6	420	1390	2160	6.4	6.1	5.9
	25+25	2.20	2.20	1.4	4.4	5.2	420	1360	1820	6.2	6.0	5.7
	25+28	2.10	2.30	1.4	4.4	5.3	420	1360	1850	6.2	6.0	5.7
	25+35	1.90	2.60	1.4	4.5	5.6	420	1390	2160	6.4	6.1	5.9
	28+28	2.25	2.25	1.4	4.5	5.5	420	1390	2120	6.4	6.1	5.9
	28+35	2.00	2.60	1.4	4.6	5.6	420	1430	2160	6.6	6.3	6.0
	35+35	2.30	2.30	1.4	4.6	5.6	420	1430	2160	6.6	6.3	6.0

Model SCM48ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
1 room	20	3.0	–	–	0.78	3.0	3.6	200	1040	1340	4.8	4.6	4.4
	22	3.2	–	–	0.78	3.2	3.7	200	1130	1390	5.2	5.0	4.8
	25	3.4	–	–	0.90	3.4	4.4	230	1290	1730	5.9	5.7	5.4
	28	4.0	–	–	0.90	4.0	4.5	230	1460	1780	6.7	6.4	6.1
	35	4.5	–	–	1.00	4.5	5.2	250	1860	2180	8.5	8.2	7.8
2 room	20+20	2.90	2.90	–	3.0	5.8	6.6	270	1710	2180	7.9	7.5	7.2
	20+22	2.80	3.07	–	3.0	5.9	6.6	270	1760	2180	8.1	7.7	7.4
	20+25	2.66	3.32	–	3.1	6.0	6.6	300	1830	2180	8.4	8.0	7.7
	20+28	2.54	3.55	–	3.1	6.1	6.6	300	1900	2180	8.7	8.3	8.0
	20+35	2.31	4.05	–	3.1	6.4	6.6	310	2060	2180	9.5	9.0	8.7
	22+22	2.97	2.97	–	3.0	5.9	6.6	270	1800	2180	8.3	7.9	7.6
	22+25	2.84	3.22	–	3.1	6.1	6.6	300	1870	2180	8.6	8.2	7.9
	22+28	2.71	3.46	–	3.1	6.2	6.6	300	1940	2180	8.9	8.5	8.2
	22+35	2.48	3.95	–	3.1	6.4	6.6	310	2110	2180	9.7	9.3	8.9
	25+25	3.09	3.09	–	3.1	6.2	6.6	330	1940	2180	8.9	8.5	8.2
	25+28	2.96	3.32	–	3.1	6.3	6.6	330	2010	2180	9.2	8.8	8.5
	25+35	2.73	3.82	–	3.2	6.6	6.6	340	2180	2180	10.0	9.6	9.2
	28+28	3.20	3.20	–	3.1	6.4	6.6	330	2080	2180	9.6	9.1	8.8
	28+35	2.92	3.66	–	3.2	6.6	6.6	340	2180	2180	10.0	9.6	9.2
	35+35	3.29	3.29	–	3.2	6.6	6.6	360	2180	2180	10.0	9.6	9.2
3 room	20+20+20	2.00	2.00	2.00	2.9	6.0	7.1	410	1380	2020	6.3	6.1	5.8
	20+20+22	1.93	1.93	2.12	2.9	6.0	7.1	410	1440	2020	6.6	6.3	6.1
	20+20+25	1.87	1.87	2.34	3.0	6.1	7.1	440	1490	2020	6.8	6.5	6.3
	20+20+28	1.84	1.84	2.57	3.0	6.2	7.1	440	1560	2020	7.2	6.9	6.6
	20+20+35	1.75	1.75	3.06	3.1	6.6	7.1	450	1710	2020	7.9	7.5	7.2
	20+22+22	1.90	2.09	2.09	2.9	6.1	7.1	410	1490	2020	6.8	6.5	6.3
	20+22+25	1.85	2.03	2.31	3.0	6.2	7.1	440	1540	2020	7.1	6.8	6.5
	20+22+28	1.81	1.99	2.54	3.0	6.3	7.1	440	1610	2020	7.4	7.1	6.8
	20+22+35	1.73	1.90	3.02	3.1	6.7	7.1	450	1760	2020	8.1	7.7	7.4
	20+25+25	1.81	2.26	2.26	3.1	6.3	7.1	470	1610	2020	7.4	7.1	6.8
	20+25+28	1.76	2.21	2.47	3.1	6.4	7.1	470	1660	2020	7.6	7.3	7.0
	20+25+35	1.70	2.13	2.98	3.2	6.8	7.1	480	1840	2020	8.4	8.1	7.7
	20+28+28	1.74	2.43	2.43	3.1	6.6	7.1	470	1730	2020	7.9	7.6	7.3
	20+28+35	1.66	2.33	2.91	3.2	6.9	7.1	480	1890	2020	8.7	8.3	8.0
	22+22+22	2.05	2.05	2.05	2.9	6.1	7.1	410	1510	2020	6.9	6.6	6.4
	22+22+25	2.01	2.01	2.28	3.0	6.3	7.1	440	1590	2020	7.3	7.0	6.7
	22+22+28	1.97	1.97	2.50	3.0	6.4	7.1	440	1660	2020	7.6	7.3	7.0
	22+22+35	1.88	1.88	2.99	3.1	6.8	7.1	450	1810	2020	8.3	7.9	7.6
	22+25+25	1.97	2.24	2.24	3.1	6.4	7.1	470	1660	2020	7.6	7.3	7.0
	22+25+28	1.92	2.18	2.45	3.1	6.6	7.1	470	1710	2020	7.9	7.5	7.2
	22+25+35	1.84	2.09	2.92	3.2	6.9	7.1	480	1860	2020	8.5	8.2	7.8
	22+28+28	1.89	2.41	2.41	3.1	6.7	7.1	470	1790	2020	8.2	7.9	7.5
	22+28+35	1.81	2.31	2.88	3.2	7.0	7.1	480	1940	2020	8.9	8.5	8.2
	25+25+25	2.18	2.18	2.18	3.2	6.6	7.1	500	1710	2020	7.9	7.5	7.2
	25+25+28	2.15	2.15	2.41	3.2	6.7	7.1	500	1790	2020	8.2	7.9	7.5
	25+25+35	2.06	2.06	2.88	3.3	7.0	7.1	520	1940	2020	8.9	8.5	8.2
	25+28+28	2.10	2.35	2.35	3.2	6.8	7.1	500	1840	2020	8.4	8.1	7.7
	28+28+28	2.32	2.32	2.32	3.2	7.0	7.1	500	1910	2020	8.8	8.4	8.0

Model SCM48ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
1 room	20	2.0	–	–	1.1	2.0	2.2	200	640	800	2.9	2.8	2.7
	22	2.2	–	–	1.1	2.2	2.3	200	760	840	3.5	3.3	3.2
	25	2.5	–	–	1.3	2.5	2.7	230	950	1030	4.4	4.2	4.0
	28	2.8	–	–	1.3	2.8	3.0	230	1120	1270	5.1	4.9	4.7
	35	3.5	–	–	1.3	3.5	3.6	250	1570	1640	7.2	6.9	6.6
2 room	20+20	2.00	2.00	–	2.7	4.0	4.9	330	1180	1700	5.4	5.2	5.0
	20+22	2.00	2.20	–	2.7	4.2	5.0	330	1250	1750	5.7	5.5	5.3
	20+25	1.96	2.44	–	2.7	4.4	5.4	360	1350	1980	6.2	5.9	5.7
	20+28	1.92	2.68	–	2.7	4.6	5.8	360	1470	2280	6.7	6.5	6.2
	20+35	1.82	3.18	–	2.8	5.0	5.9	380	1720	2340	7.9	7.6	7.2
	22+22	2.20	2.20	–	2.7	4.4	5.1	330	1330	1800	6.1	5.8	5.6
	22+25	2.15	2.45	–	2.7	4.6	5.4	360	1420	2040	6.5	6.2	6.0
	22+28	2.07	2.63	–	2.7	4.7	5.8	360	1550	2340	7.1	6.8	6.5
	22+35	1.97	3.13	–	2.8	5.1	5.9	380	1800	2340	8.3	7.9	7.6
	25+25	2.35	2.35	–	2.8	4.7	5.8	400	1550	2280	7.1	6.8	6.5
	25+28	2.31	2.59	–	2.8	4.9	5.9	400	1650	2340	7.6	7.2	6.9
	25+35	2.21	3.09	–	2.9	5.3	5.9	420	1910	2340	8.8	8.4	8.0
	28+28	2.50	2.50	–	2.8	5.0	5.9	400	1750	2340	8.0	7.7	7.4
	28+35	2.40	3.00	–	2.9	5.4	5.9	420	2040	2340	9.4	9.0	8.6
	35+35	2.90	2.90	–	2.9	5.8	5.9	440	2310	2340	10.6	10.1	9.7
3 room	20+20+20	1.60	1.60	1.60	3.4	4.8	6.7	590	1190	2280	5.5	5.2	5.0
	20+20+22	1.55	1.55	1.70	3.4	4.8	6.7	590	1190	2280	5.5	5.2	5.0
	20+20+25	1.51	1.51	1.88	3.4	4.9	6.7	630	1230	2280	5.6	5.4	5.2
	20+20+28	1.47	1.47	2.06	3.4	5.0	6.7	630	1260	2280	5.8	5.5	5.3
	20+20+35	1.39	1.39	2.43	3.5	5.2	6.7	650	1370	2280	6.3	6.0	5.8
	20+22+22	1.53	1.68	1.68	3.4	4.9	6.7	590	1200	2280	5.5	5.3	5.1
	20+22+25	1.49	1.64	1.87	3.4	5.0	6.7	630	1260	2280	5.8	5.5	5.3
	20+22+28	1.43	1.57	2.00	3.4	5.0	6.7	630	1290	2280	5.9	5.7	5.4
	20+22+35	1.35	1.49	2.36	3.5	5.2	6.7	650	1400	2280	6.4	6.1	5.9
	20+25+25	1.43	1.79	1.79	3.5	5.0	6.7	670	1290	2280	5.9	5.7	5.4
	20+25+28	1.40	1.75	1.96	3.5	5.1	6.7	670	1340	2280	6.2	5.9	5.6
	20+25+35	1.30	1.63	2.28	3.6	5.2	6.7	690	1430	2280	6.6	6.3	6.0
	20+28+28	1.37	1.92	1.92	3.5	5.2	6.7	670	1370	2280	6.3	6.0	5.8
	20+28+35	1.28	1.79	2.23	3.6	5.3	6.7	690	1490	2280	6.8	6.5	6.3
	22+22+22	1.63	1.63	1.63	3.4	4.9	6.7	590	1230	2280	5.6	5.4	5.2
	22+22+25	1.59	1.59	1.81	3.4	5.0	6.7	630	1290	2280	5.9	5.7	5.4
	22+22+28	1.56	1.56	1.98	3.4	5.1	6.7	630	1320	2280	6.1	5.8	5.6
	22+22+35	1.45	1.45	2.30	3.5	5.2	6.7	650	1430	2280	6.6	6.3	6.0
	22+25+25	1.56	1.77	1.77	3.5	5.1	6.7	670	1320	2280	6.1	5.8	5.6
	22+25+28	1.53	1.73	1.94	3.5	5.2	6.7	670	1370	2280	6.3	6.0	5.8
	22+25+35	1.42	1.62	2.26	3.6	5.3	6.7	690	1460	2280	6.7	6.4	6.1
	22+28+28	1.47	1.87	1.87	3.5	5.2	6.7	670	1400	2280	6.4	6.1	5.9
	22+28+35	1.40	1.78	2.22	3.6	5.4	6.7	690	1520	2280	7.0	6.7	6.4
	25+25+25	1.73	1.73	1.73	3.6	5.2	6.7	710	1370	2280	6.3	6.0	5.8
	25+25+28	1.67	1.67	1.87	3.6	5.2	6.7	710	1400	2280	6.4	6.1	5.9
	25+25+35	1.59	1.59	2.22	3.7	5.4	6.7	730	1520	2280	7.0	6.7	6.4
	25+28+28	1.64	1.83	1.83	3.6	5.3	6.7	710	1460	2280	6.7	6.4	6.1
	28+28+28	1.77	1.77	1.77	3.6	5.3	6.7	710	1490	2280	6.8	6.5	6.3

Model SCM60ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
1 room	20	3.0	–	–	0.75	3.0	3.3	320	1030	1160	4.7	4.5	4.3
	22	3.2	–	–	0.75	3.2	3.4	320	1100	1200	5.1	4.8	4.6
	25	3.4	–	–	0.75	3.4	3.6	320	1200	1300	5.5	5.3	5.1
	28	4.0	–	–	0.75	4.0	4.2	320	1450	1550	6.7	6.4	6.1
	35	4.5	–	–	0.75	4.5	4.6	320	1750	1800	8.0	7.7	7.4
	50	5.8	–	–	0.75	5.8	6.2	320	2100	2400	9.6	9.2	8.8
	60	6.8	–	–	0.75	6.8	6.9	320	2600	2650	11.9	11.4	10.9
2 room	20+20	2.50	2.50	–	1.1	5.0	6.4	330	1300	2300	6.0	5.7	5.5
	20+22	2.43	2.67	–	1.1	5.1	6.4	330	1350	2300	6.2	5.9	5.7
	20+25	2.31	2.89	–	1.1	5.2	6.5	330	1400	2350	6.4	6.1	5.9
	20+28	2.25	3.15	–	1.1	5.4	6.5	330	1550	2350	7.1	6.8	6.5
	20+35	2.18	3.82	–	1.1	6.0	6.6	330	1850	2500	8.5	8.1	7.8
	20+50	1.89	4.71	–	1.2	6.6	6.8	360	2100	2700	9.6	9.2	8.8
	20+60	1.68	5.03	–	1.2	6.7	6.8	360	2400	2700	11.0	10.5	10.1
	22+22	2.55	2.55	–	1.1	5.1	6.5	330	1450	2350	6.7	6.4	6.1
	22+25	2.48	2.82	–	1.1	5.3	6.5	330	1500	2350	6.9	6.6	6.3
	22+28	2.55	3.25	–	1.1	5.8	6.5	330	1700	2400	7.8	7.5	7.2
	22+35	2.35	3.75	–	1.1	6.1	6.6	330	1900	2500	8.7	8.3	8.0
	22+50	2.02	4.58	–	1.2	6.6	6.8	360	2150	2700	9.9	9.4	9.0
	22+60	1.80	4.90	–	1.2	6.7	6.8	360	2250	2700	10.3	9.9	9.5
	25+25	2.75	2.75	–	1.1	5.5	6.5	330	1600	2350	7.3	7.0	6.7
	25+28	2.78	3.12	–	1.1	5.9	6.5	330	1800	2400	8.3	7.9	7.6
	25+35	2.63	3.68	–	1.1	6.3	6.6	330	2000	2500	9.2	8.8	8.4
	25+50	2.23	4.47	–	1.2	6.7	6.8	360	2250	2700	10.3	9.9	9.5
	25+60	1.97	4.73	–	1.2	6.7	6.8	360	2300	2700	10.6	10.1	9.7
	28+28	3.20	3.20	–	1.1	6.4	6.6	330	2050	2450	9.4	9.0	8.6
	28+35	2.98	3.72	–	1.1	6.7	6.7	330	2200	2550	10.1	9.7	9.3
	28+50	2.41	4.29	–	1.2	6.7	6.8	360	2400	2700	11.0	10.5	10.1
	28+60	2.13	4.57	–	1.2	6.7	6.8	360	2450	2700	11.2	10.8	10.3
	35+35	3.35	3.35	–	1.1	6.7	6.7	330	2350	2600	10.8	10.3	9.9
	35+50	2.76	3.94	–	1.2	6.7	6.8	360	2550	2700	11.7	11.2	10.7
	35+60	2.47	4.23	–	1.2	6.7	6.8	360	2600	2700	11.9	11.4	10.9
	50+50	3.35	3.35	–	1.5	6.7	6.8	420	2600	2700	11.9	11.4	10.9
	50+60	3.05	3.65	–	1.5	6.7	6.8	420	2650	2700	12.2	11.6	11.2
3 room	20+20+20	2.23	2.23	2.23	1.7	6.7	7.2	440	1630	2700	7.5	7.2	6.9
	20+20+22	2.16	2.16	2.38	1.7	6.7	7.2	440	1640	2700	7.5	7.2	6.9
	20+20+25	2.06	2.06	2.58	1.7	6.7	7.2	440	1650	2700	7.6	7.2	6.9
	20+20+28	2.03	2.03	2.84	1.7	6.9	7.2	440	1750	2700	8.0	7.7	7.4
	20+20+35	1.87	1.87	3.27	1.7	7.0	7.2	440	1850	2700	8.5	8.1	7.8
	20+20+50	1.58	1.58	3.94	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	20+20+60	1.42	1.42	4.26	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	20+22+22	2.09	2.30	2.30	1.7	6.7	7.2	440	1650	2700	7.6	7.2	6.9
	20+22+25	2.06	2.27	2.57	1.7	6.9	7.2	440	1750	2700	8.0	7.7	7.4
	20+22+28	2.00	2.20	2.80	1.7	7.0	7.2	440	1800	2700	8.3	7.9	7.6
	20+22+35	1.82	2.00	3.18	1.7	7.0	7.2	440	1850	2700	8.5	8.1	7.8
	20+22+50	1.54	1.70	3.86	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	20+22+60	1.39	1.53	4.18	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	20+25+25	2.00	2.50	2.50	1.7	7.0	7.2	440	1800	2700	8.3	7.9	7.6
	20+25+28	1.92	2.40	2.68	1.7	7.0	7.2	440	1800	2700	8.3	7.9	7.6
	20+25+35	1.75	2.19	3.06	1.7	7.0	7.2	440	1950	2700	9.0	8.6	8.2
	20+25+50	1.49	1.87	3.74	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	20+25+60	1.35	1.69	4.06	1.9	7.1	7.2	500	2100	2700	9.6	9.2	8.8
	20+28+28	1.84	2.58	2.58	1.7	7.0	7.2	440	1850	2700	8.5	8.1	7.8
	20+28+35	1.69	2.36	2.95	1.7	7.0	7.2	440	1950	2700	9.0	8.6	8.2
	20+28+50	1.45	2.03	3.62	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	20+28+60	1.31	1.84	3.94	1.9	7.1	7.2	500	2100	2700	9.6	9.2	8.8
	20+35+35	1.58	2.76	2.76	1.7	7.1	7.2	440	2100	2700	9.6	9.2	8.8
	20+35+50	1.35	2.37	3.38	1.9	7.1	7.2	500	2100	2700	9.6	9.2	8.8
	22+22+22	2.23	2.23	2.23	1.7	6.7	7.2	440	1650	2700	7.6	7.2	6.9
	22+22+25	2.20	2.20	2.50	1.7	6.9	7.2	440	1750	2700	8.0	7.7	7.4
	22+22+28	2.14	2.14	2.72	1.7	7.0	7.2	440	1800	2700	8.3	7.9	7.6

Model SCM60ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
3 room	22+22+35	1.95	1.95	3.10	1.7	7.0	7.2	440	1850	2700	8.5	8.1	7.8
	22+22+50	1.64	1.64	3.72	1.9	7.0	7.2	500	1740	2700	8.0	7.6	7.3
	22+22+60	1.50	1.50	4.10	1.9	7.1	7.2	500	1950	2700	9.0	8.6	8.2
	22+25+25	2.14	2.43	2.43	1.7	7.0	7.2	440	1750	2700	8.0	7.7	7.4
	22+25+28	2.05	2.33	2.61	1.7	7.0	7.2	440	1850	2700	8.5	8.1	7.8
	22+25+35	1.88	2.13	2.99	1.7	7.0	7.2	440	1950	2700	9.0	8.6	8.2
	22+25+50	1.61	1.83	3.66	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	22+25+60	1.46	1.66	3.98	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	22+28+28	1.97	2.51	2.51	1.7	7.0	7.2	440	1950	2700	9.0	8.6	8.2
	22+28+35	1.84	2.34	2.92	1.7	7.1	7.2	440	2050	2700	9.4	9.0	8.6
	22+28+50	1.56	1.99	3.55	1.9	7.1	7.2	500	2100	2700	9.6	9.2	8.8
	22+28+60	1.42	1.81	3.87	1.9	7.1	7.2	500	2100	2700	9.6	9.2	8.8
	22+35+35	1.70	2.70	2.70	1.7	7.1	7.2	440	2150	2700	9.9	9.4	9.0
	22+35+50	1.46	2.32	3.32	1.9	7.1	7.2	500	2200	2700	10.1	9.7	9.3
	25+25+25	2.33	2.33	2.33	1.7	7.0	7.2	440	1800	2700	8.3	7.9	7.6
	25+25+28	2.24	2.24	2.51	1.7	7.0	7.2	440	1900	2700	8.7	8.3	8.0
	25+25+35	2.06	2.06	2.88	1.7	7.0	7.2	440	2000	2700	9.2	8.8	8.4
	25+25+50	1.78	1.78	3.55	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	25+25+60	1.61	1.61	3.87	1.9	7.1	7.2	500	2050	2700	9.4	9.0	8.6
	25+28+28	2.19	2.45	2.45	1.7	7.1	7.2	440	2000	2700	9.2	8.8	8.4
	25+28+35	2.02	2.26	2.82	1.7	7.1	7.2	440	2100	2700	9.6	9.2	8.8
	25+28+50	1.72	1.93	3.45	1.9	7.1	7.2	500	2250	2700	10.3	9.9	9.5
	25+35+35	1.87	2.62	2.62	1.7	7.1	7.2	440	2200	2700	10.1	9.7	9.3
	25+35+50	1.61	2.26	3.23	1.9	7.1	7.2	500	2250	2700	10.3	9.9	9.5
	28+28+28	2.37	2.37	2.37	1.7	7.1	7.2	440	2150	2700	9.9	9.4	9.0
	28+28+35	2.18	2.18	2.73	1.7	7.1	7.2	440	2200	2700	10.1	9.7	9.3
	28+28+50	1.88	1.88	3.35	1.9	7.1	7.2	500	2350	2700	10.8	10.3	9.9
	28+35+35	2.03	2.54	2.54	1.7	7.1	7.2	440	2300	2700	10.6	10.1	9.7
	35+35+35	2.37	2.37	2.37	1.7	7.1	7.2	440	2400	2700	11.0	10.5	10.1

Model SCM60ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
1 room	20	2.0	–	–	1.4	2.0	2.2	400	660	720	3.0	2.9	2.8
	22	2.2	–	–	1.4	2.2	2.3	400	720	750	3.3	3.2	3.0
	25	2.5	–	–	1.4	2.5	2.6	400	800	830	3.7	3.5	3.4
	28	2.8	–	–	1.4	2.8	3.0	400	950	1050	4.4	4.2	4.0
	35	3.5	–	–	1.4	3.5	3.6	400	1300	1350	6.0	5.7	5.5
	50	5.0	–	–	1.4	5.0	5.1	400	2200	2250	10.1	9.7	9.3
	60	6.0	–	–	1.4	6.0	6.1	400	2700	2800	12.4	11.9	11.4
2 room	20+20	2.00	2.00	–	1.5	4.0	4.2	410	1320	1430	6.1	5.8	5.6
	20+22	2.00	2.20	–	1.5	4.2	4.4	410	1390	1510	6.4	6.1	5.9
	20+25	2.00	2.50	–	1.5	4.5	4.7	410	1490	1690	6.8	6.5	6.3
	20+28	2.00	2.80	–	1.5	4.8	4.9	410	1660	1750	7.6	7.3	7.0
	20+35	2.00	3.50	–	1.5	5.5	5.7	410	1980	2200	9.1	8.7	8.3
	20+50	1.71	4.29	–	1.6	6.0	6.1	440	2490	2600	11.4	10.9	10.5
	20+60	1.65	4.95	–	1.6	6.6	6.6	440	2880	2880	13.2	12.6	12.1
	22+22	2.20	2.20	–	1.5	4.4	4.6	410	1450	1650	6.7	6.4	6.1
	22+25	2.20	2.50	–	1.5	4.7	4.9	410	1600	1750	7.3	7.0	6.7
	22+28	2.20	2.80	–	1.5	5.0	5.2	410	1720	1900	7.9	7.6	7.2
	22+35	2.05	3.25	–	1.5	5.3	5.4	410	2100	2150	9.6	9.2	8.8
	22+50	1.86	4.24	–	1.6	6.1	6.4	440	2550	2750	11.7	11.2	10.7
	22+60	1.74	4.76	–	1.6	6.5	6.6	440	2800	2880	12.9	12.3	11.8
	25+25	2.50	2.50	–	1.5	5.0	5.2	410	1720	1900	7.9	7.6	7.2
	25+28	2.50	2.80	–	1.5	5.3	5.4	410	1850	1950	8.5	8.1	7.8
	25+35	2.42	3.38	–	1.5	5.8	5.9	410	2200	2300	10.1	9.7	9.3
	25+50	2.10	4.20	–	1.6	6.3	6.5	440	2720	2850	12.5	11.9	11.4
	25+60	1.94	4.66	–	1.6	6.6	6.6	440	2880	2880	13.2	12.6	12.1
	28+28	2.80	2.80	–	1.5	5.6	5.7	410	2000	2100	9.2	8.8	8.4
	28+35	2.71	3.39	–	1.5	6.1	6.2	410	2420	2500	11.1	10.6	10.2
	28+50	2.37	4.23	–	1.6	6.6	6.6	440	2880	2880	13.2	12.6	12.1
	28+60	2.10	4.50	–	1.6	6.6	6.6	440	2880	2880	13.2	12.6	12.1
	35+35	3.30	3.30	–	1.5	6.6	6.6	410	2880	2880	13.2	12.6	12.1
	35+50	2.72	3.88	–	1.6	6.6	6.6	440	2880	2880	13.2	12.6	12.1
	35+60	2.43	4.17	–	1.6	6.6	6.6	440	2880	2880	13.2	12.6	12.1
	50+50	3.30	3.30	–	1.9	6.6	6.6	500	2880	2880	13.2	12.6	12.1
	50+60	3.00	3.60	–	1.9	6.6	6.6	500	2880	2880	13.2	12.6	12.1
3 room	20+20+20	1.67	1.67	1.67	1.9	5.0	6.8	620	1450	2950	6.7	6.4	6.1
	20+20+22	1.61	1.61	1.77	1.9	5.0	6.8	620	1450	2950	6.7	6.4	6.1
	20+20+25	1.57	1.57	1.96	1.9	5.1	6.8	620	1470	2950	6.7	6.5	6.2
	20+20+28	1.53	1.53	2.14	1.9	5.2	6.8	620	1500	2950	6.9	6.6	6.3
	20+20+35	1.41	1.41	2.47	1.9	5.3	6.9	620	1550	3000	7.1	6.8	6.5
	20+20+50	1.29	1.29	3.22	2.1	5.8	6.9	680	1750	3000	8.0	7.7	7.4
	20+20+60	1.20	1.20	3.60	2.1	6.0	6.9	680	2000	3000	9.2	8.8	8.4
	20+22+22	1.59	1.75	1.75	1.9	5.1	6.8	620	1470	2950	6.7	6.5	6.2
	20+22+25	1.52	1.67	1.90	1.9	5.1	6.8	620	1470	2950	6.7	6.5	6.2
	20+22+28	1.49	1.63	2.08	1.9	5.2	6.9	620	1500	3000	6.9	6.6	6.3
	20+22+35	1.38	1.51	2.41	1.9	5.3	6.9	620	1550	3000	7.1	6.8	6.5
	20+22+50	1.26	1.39	3.15	2.1	5.8	6.9	680	1750	3000	8.0	7.7	7.4
	20+22+60	1.20	1.32	3.59	2.1	6.1	6.9	680	2000	3000	9.2	8.8	8.4
	20+25+25	1.49	1.86	1.86	1.9	5.2	6.9	620	1500	3000	6.9	6.6	6.3
	20+25+28	1.42	1.78	1.99	1.9	5.2	6.9	620	1500	3000	6.9	6.6	6.3
	20+25+35	1.38	1.72	2.41	1.9	5.5	6.9	620	1620	3000	7.4	7.1	6.8
	20+25+50	1.24	1.55	3.11	2.1	5.9	6.9	680	1800	3000	8.3	7.9	7.6
	20+25+60	1.18	1.48	3.54	2.1	6.2	6.9	680	2050	3000	9.4	9.0	8.6
	20+28+28	1.39	1.95	1.95	1.9	5.3	6.9	620	1550	3000	7.1	6.8	6.5
	20+28+35	1.33	1.86	2.32	1.9	5.5	6.9	620	1620	3000	7.4	7.1	6.8
	20+28+50	1.22	1.71	3.06	2.1	6.0	6.9	680	1900	3000	8.7	8.3	8.0
	20+28+60	1.15	1.61	3.44	2.1	6.2	6.9	680	2050	3000	9.4	9.0	8.6
	20+35+35	1.29	2.26	2.26	1.9	5.8	6.9	620	1750	3000	8.0	7.7	7.4
	20+35+50	1.18	2.07	2.95	2.1	6.2	6.9	680	2050	3000	9.4	9.0	8.6
	22+22+22	1.70	1.70	1.70	1.9	5.1	6.8	620	1470	2950	6.7	6.5	6.2
	22+22+25	1.66	1.66	1.88	1.9	5.2	6.8	620	1500	2950	6.9	6.6	6.3
	22+22+28	1.59	1.59	2.02	1.9	5.2	6.9	620	1500	3000	6.9	6.6	6.3

Model SCM60ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
3 room	22+22+35	1.50	1.50	2.39	1.9	5.4	6.9	620	1600	3000	7.3	7.0	6.7
	22+22+50	1.40	1.40	3.19	2.1	6.0	6.9	680	1860	3000	8.5	8.2	7.8
	22+22+60	1.29	1.29	3.52	2.1	6.1	6.9	680	2000	3000	9.2	8.8	8.4
	22+25+25	1.59	1.81	1.81	1.9	5.2	6.9	620	1500	3000	6.9	6.6	6.3
	22+25+28	1.55	1.77	1.98	1.9	5.3	6.9	620	1550	3000	7.1	6.8	6.5
	22+25+35	1.48	1.68	2.35	1.9	5.5	6.9	620	1620	3000	7.4	7.1	6.8
	22+25+50	1.36	1.55	3.09	2.1	6.0	6.9	680	1860	3000	8.5	8.2	7.8
	22+25+60	1.27	1.45	3.48	2.1	6.2	6.9	680	2000	3000	9.2	8.8	8.4
	22+28+28	1.52	1.94	1.94	1.9	5.4	6.9	620	1600	3000	7.3	7.0	6.7
	22+28+35	1.45	1.84	2.31	1.9	5.6	6.9	620	1650	3000	7.6	7.2	6.9
	22+28+50	1.32	1.68	3.00	2.1	6.0	6.9	680	1860	3000	8.5	8.2	7.8
	22+28+60	1.26	1.60	3.44	2.1	6.3	6.9	680	2050	3000	9.4	9.0	8.6
	22+35+35	1.39	2.21	2.21	1.9	5.8	6.9	620	1750	3000	8.0	7.7	7.4
	22+35+50	1.27	2.03	2.90	2.1	6.2	6.9	680	2000	3000	9.2	8.8	8.4
	25+25+25	1.77	1.77	1.77	1.9	5.3	6.9	620	1550	3000	7.1	6.8	6.5
	25+25+28	1.73	1.73	1.94	1.9	5.4	6.9	620	1600	3000	7.3	7.0	6.7
	25+25+35	1.65	1.65	2.31	1.9	5.6	6.9	620	1650	3000	7.6	7.2	6.9
	25+25+50	1.50	1.50	3.00	2.1	6.0	6.9	680	1860	3000	8.5	8.2	7.8
	25+25+60	1.43	1.43	3.44	2.1	6.3	6.9	680	2050	3000	9.4	9.0	8.6
	25+28+28	1.70	1.90	1.90	1.9	5.5	6.9	620	1620	3000	7.4	7.1	6.8
	25+28+35	1.62	1.81	2.27	1.9	5.7	6.9	620	1700	3000	7.8	7.5	7.2
	25+28+50	1.48	1.66	2.96	2.1	6.1	6.9	680	2000	3000	9.2	8.8	8.4
	25+35+35	1.55	2.17	2.17	1.9	5.9	6.9	620	1800	3000	8.3	7.9	7.6
	25+35+50	1.43	2.00	2.86	2.1	6.3	6.9	680	2050	3000	9.4	9.0	8.6
	28+28+28	1.87	1.87	1.87	1.9	5.6	6.9	620	1650	3000	7.6	7.2	6.9
	28+28+35	1.78	1.78	2.23	1.9	5.8	6.9	620	1750	3000	8.0	7.7	7.4
	28+28+50	1.64	1.64	2.92	2.1	6.2	6.9	680	2100	3000	9.6	9.2	8.8
	28+35+35	1.69	2.11	2.11	1.9	5.9	6.9	620	1800	3000	8.3	7.9	7.6
	35+35+35	2.07	2.07	2.07	1.9	6.2	6.9	620	2100	3000	9.6	9.2	8.8

Model SCM80ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
1 room	20	3.0	–	–	–	0.95	3.0	3.7	250	1100	1500	5.1	4.8	4.6
	22	3.2	–	–	–	0.95	3.2	3.9	250	1200	1650	5.5	5.3	5.1
	25	3.4	–	–	–	0.95	3.4	4.1	250	1350	1800	6.2	5.9	5.7
	28	4.0	–	–	–	0.95	4.0	4.3	250	1700	1950	7.8	7.5	7.2
	35	4.5	–	–	–	0.95	4.5	4.8	250	2100	2350	9.6	9.2	8.8
	50	5.8	–	–	–	0.95	5.8	6.1	250	2900	3100	13.3	12.7	12.2
	60	6.8	–	–	–	0.95	6.8	7.1	250	3300	3500	15.2	14.5	13.9
2 room	20+20	2.70	2.70	–	–	2.1	5.4	8.3	270	1100	3500	5.1	4.8	4.6
	20+22	2.67	2.93	–	–	2.1	5.6	8.3	270	1300	3500	6.0	5.7	5.5
	20+25	2.62	3.28	–	–	2.1	5.9	8.3	270	1500	3500	6.9	6.6	6.3
	20+28	2.58	3.62	–	–	2.1	6.2	8.3	270	1780	3500	8.2	7.8	7.5
	20+35	2.51	4.39	–	–	2.1	6.9	8.3	270	2400	3500	11.0	10.5	10.1
	20+50	2.37	5.93	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	20+60	2.08	6.23	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	22+22	2.90	2.90	–	–	2.1	5.8	8.3	270	1450	3500	6.7	6.4	6.1
	22+25	2.86	3.24	–	–	2.1	6.1	8.3	270	1700	3500	7.8	7.5	7.2
	22+28	2.82	3.58	–	–	2.1	6.4	8.3	270	1950	3500	9.0	8.6	8.2
	22+35	2.74	4.36	–	–	2.1	7.1	8.3	270	2550	3500	11.7	11.2	10.7
	22+50	2.54	5.76	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	22+60	2.23	6.07	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	25+25	3.20	3.20	–	–	2.1	6.4	8.3	270	1950	3500	9.0	8.6	8.2
	25+28	3.16	3.54	–	–	2.1	6.7	8.3	270	2420	3500	11.1	10.6	10.2
	25+35	3.08	4.32	–	–	2.1	7.4	8.3	270	2840	3500	13.0	12.5	12.0
	25+50	2.77	5.53	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	25+60	2.44	5.86	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	28+28	3.50	3.50	–	–	2.1	7.0	8.3	270	2480	3500	11.4	10.9	10.4
	28+35	3.42	4.28	–	–	2.1	7.7	8.3	270	3070	3500	14.1	13.5	12.9
	28+50	2.98	5.32	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	28+60	2.64	5.66	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	35+35	4.15	4.15	–	–	2.1	8.3	8.3	270	3500	3500	16.1	15.4	14.7
	35+50	3.42	4.88	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	35+60	3.06	5.24	–	–	2.2	8.3	8.3	330	3500	3500	16.1	15.4	14.7
	50+50	4.15	4.15	–	–	2.4	8.3	8.3	380	3500	3500	16.1	15.4	14.7
	50+60	3.77	4.53	–	–	2.4	8.3	8.3	380	3500	3500	16.1	15.4	14.7
3 room	20+20+20	2.56	2.56	2.56	–	4.3	7.7	9.0	400	2210	3050	10.1	9.7	9.3
	20+20+22	2.51	2.51	2.76	–	4.3	7.8	9.0	400	2270	3050	10.4	10.0	9.6
	20+20+25	2.45	2.45	3.06	–	4.3	8.0	9.0	400	2400	3050	11.0	10.5	10.1
	20+20+28	2.39	2.39	3.35	–	4.3	8.1	9.0	400	2450	3050	11.2	10.8	10.3
	20+20+35	2.28	2.28	3.99	–	4.3	8.5	9.0	400	2730	3050	12.5	12.0	11.5
	20+20+50	2.00	2.00	5.00	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+20+60	1.80	1.80	5.40	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+22+22	2.47	2.72	2.72	–	4.3	7.9	9.0	400	2330	3050	10.7	10.2	9.8
	20+22+25	2.41	2.65	3.01	–	4.3	8.1	9.0	400	2450	3050	11.2	10.8	10.3
	20+22+28	2.36	2.59	3.30	–	4.3	8.3	9.0	400	2590	3050	11.9	11.4	10.9
	20+22+35	2.25	2.47	3.93	–	4.3	8.7	9.0	400	2860	3050	13.1	12.6	12.0
	20+22+50	1.96	2.15	4.89	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+22+60	1.76	1.94	5.29	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+25+25	2.36	2.95	2.95	–	4.3	8.3	9.0	400	2590	3050	11.9	11.4	10.9
	20+25+28	2.31	2.89	3.23	–	4.3	8.4	9.0	400	2650	3050	12.2	11.6	11.2
	20+25+35	2.21	2.76	3.86	–	4.3	8.8	9.0	400	2920	3050	13.4	12.8	12.3
	20+25+50	1.89	2.37	4.74	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+25+60	1.71	2.14	5.14	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+28+28	2.26	3.17	3.17	–	4.3	8.6	9.0	400	2800	3050	12.9	12.3	11.8
	20+28+35	2.17	3.04	3.80	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	20+28+50	1.84	2.57	4.59	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+28+60	1.67	2.33	5.00	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+35+35	2.00	3.50	3.50	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	20+35+50	1.71	3.00	4.29	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+35+60	1.57	2.74	4.70	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	20+50+50	1.50	3.75	3.75	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
	20+50+60	1.38	3.46	4.15	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8

Model SCM80ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
3 room	22+22+22	2.67	2.67	2.67	–	4.3	8.0	9.0	400	2400	3050	11.0	10.5	10.1
	22+22+25	2.61	2.61	2.97	–	4.3	8.2	9.0	400	2520	3050	11.6	11.1	10.6
	22+22+28	2.56	2.56	3.25	–	4.3	8.4	9.0	400	2650	3050	12.2	11.6	11.2
	22+22+35	2.44	2.44	3.89	–	4.3	8.8	9.0	400	2920	3050	13.4	12.8	12.3
	22+22+50	2.11	2.11	4.79	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+22+60	1.90	1.90	5.19	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+25+25	2.56	2.91	2.91	–	4.3	8.4	9.0	400	2650	3050	12.2	11.6	11.2
	22+25+28	2.50	2.85	3.19	–	4.3	8.5	9.0	400	2730	3050	12.5	12.0	11.5
	22+25+35	2.40	2.73	3.82	–	4.3	8.9	9.0	400	2980	3050	13.7	13.1	12.5
	22+25+50	2.04	2.32	4.64	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+25+60	1.85	2.10	5.05	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+28+28	2.46	3.13	3.13	–	4.3	8.7	9.0	400	2860	3050	13.1	12.6	12.0
	22+28+35	2.33	2.96	3.71	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	22+28+50	1.98	2.52	4.50	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+28+60	1.80	2.29	4.91	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+35+35	2.15	3.42	3.42	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	22+35+50	1.85	2.94	4.21	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+35+60	1.69	2.69	4.62	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	22+50+50	1.62	3.69	3.69	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
	22+50+60	1.50	3.41	4.09	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
	25+25+25	2.85	2.85	2.85	–	4.3	8.5	9.0	400	2730	3050	12.5	12.0	11.5
	25+25+28	2.79	2.79	3.13	–	4.3	8.7	9.0	400	2860	3050	13.1	12.6	12.0
	25+25+35	2.65	2.65	3.71	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	25+25+50	2.25	2.25	4.50	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	25+25+60	2.05	2.05	4.91	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	25+28+28	2.74	3.07	3.07	–	4.3	8.9	9.0	400	2980	3050	13.7	13.1	12.5
	25+28+35	2.56	2.86	3.58	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	25+28+50	2.18	2.45	4.37	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	25+28+60	1.99	2.23	4.78	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	25+35+35	2.37	3.32	3.32	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	25+35+50	2.05	2.86	4.09	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	25+35+60	1.88	2.63	4.50	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	25+50+50	1.80	3.60	3.60	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
	25+50+60	1.67	3.33	4.00	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
	28+28+28	3.00	3.00	3.00	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	28+28+35	2.77	2.77	3.46	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	28+28+50	2.38	2.38	4.25	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	28+28+60	2.17	2.17	4.66	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	28+35+35	2.57	3.21	3.21	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	28+35+50	2.23	2.79	3.98	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	28+35+60	2.05	2.56	4.39	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	28+50+50	1.97	3.52	3.52	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
	35+35+35	3.00	3.00	3.00	–	4.3	9.0	9.0	400	3050	3050	14.0	13.4	12.8
	35+35+50	2.63	2.63	3.75	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	35+35+60	2.42	2.42	4.15	–	4.4	9.0	9.0	460	3050	3050	14.0	13.4	12.8
	35+50+50	2.33	3.33	3.33	–	4.6	9.0	9.0	520	3050	3050	14.0	13.4	12.8
4 room	20+20+20+20	2.28	2.28	2.28	2.28	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+20+22	2.22	2.22	2.22	2.44	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+20+25	2.15	2.15	2.15	2.68	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+20+28	2.07	2.07	2.07	2.90	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+20+35	1.93	1.93	1.93	3.37	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+20+20+50	1.67	1.67	1.67	4.19	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+20+20+60	1.54	1.54	1.54	4.62	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+20+22+22	2.17	2.17	2.39	2.39	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+22+25	2.10	2.10	2.31	2.62	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+22+28	2.03	2.03	2.23	2.84	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+22+35	1.89	1.89	2.08	3.31	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+20+22+50	1.65	1.65	1.81	4.12	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+20+22+60	1.52	1.52	1.67	4.55	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+20+25+25	2.03	2.03	2.54	2.54	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+20+25+28	1.97	1.97	2.46	2.75	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0

Model SCM80ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
4 room	20+20+25+35	1.83	1.83	2.29	3.21	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+20+25+50	1.61	1.61	2.01	4.01	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+20+25+60	1.48	1.48	1.85	4.45	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+20+28+28	1.91	1.91	2.67	2.67	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+20+28+35	1.78	1.78	2.50	3.12	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+20+28+50	1.57	1.57	2.19	3.92	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+20+28+60	1.45	1.45	2.03	4.35	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+20+35+35	1.67	1.67	2.93	2.93	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+20+35+50	1.48	1.48	2.59	3.71	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+20+35+60	1.38	1.38	2.41	4.13	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+22+22+22	2.12	2.33	2.33	2.33	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+22+22+25	2.05	2.26	2.26	2.57	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+22+22+28	1.99	2.19	2.19	2.78	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+22+22+35	1.85	2.04	2.04	3.24	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+22+22+50	1.62	1.78	1.78	4.05	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+22+22+60	1.49	1.64	1.64	4.48	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+22+25+25	1.99	2.19	2.48	2.48	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	20+22+25+28	1.93	2.12	2.41	2.70	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+22+25+35	1.80	1.98	2.25	3.15	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+22+25+50	1.58	1.74	1.97	3.95	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+22+25+60	1.46	1.61	1.83	4.38	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+22+28+28	1.87	2.06	2.62	2.62	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+22+28+35	1.75	1.93	2.45	3.06	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+22+28+50	1.54	1.70	2.16	3.85	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+22+28+60	1.43	1.57	2.00	4.29	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+22+35+35	1.65	1.81	2.88	2.88	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+22+35+50	1.46	1.61	2.56	3.65	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+25+25+25	1.93	2.41	2.41	2.41	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+25+25+28	1.87	2.34	2.34	2.62	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+25+25+35	1.75	2.19	2.19	3.06	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+25+25+50	1.54	1.93	1.93	3.85	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	20+25+25+60	1.43	1.79	1.79	4.29	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+25+28+28	1.82	2.27	2.54	2.54	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+25+28+35	1.70	2.13	2.39	2.98	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+25+28+50	1.51	1.88	2.11	3.76	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+25+28+60	1.40	1.75	1.96	4.19	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+25+35+35	1.61	2.01	2.81	2.81	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+25+35+50	1.43	1.79	2.50	3.57	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+28+28+28	1.77	2.47	2.47	2.47	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+28+28+35	1.66	2.32	2.32	2.91	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+28+28+50	1.47	2.06	2.06	3.68	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+28+35+35	1.57	2.19	2.74	2.74	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	20+28+35+50	1.40	1.96	2.45	3.49	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	20+35+35+35	1.48	2.59	2.59	2.59	4.8	9.3	9.5	450	2430	2600	11.2	10.7	10.2
	22+22+22+22	2.28	2.28	2.28	2.28	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	22+22+22+25	2.21	2.21	2.21	2.51	4.8	9.1	9.5	450	2370	2600	10.9	10.4	10.0
	22+22+22+28	2.14	2.14	2.14	2.73	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+22+35	2.00	2.00	2.00	3.18	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+22+50	1.75	1.75	1.75	3.98	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	22+22+22+60	1.62	1.62	1.62	4.41	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+22+25+25	2.14	2.14	2.43	2.43	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+25+28	2.08	2.08	2.36	2.64	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+25+35	1.94	1.94	2.21	3.09	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+25+50	1.71	1.71	1.94	3.88	4.9	9.2	9.5	500	2400	2600	11.0	10.5	10.1
	22+22+25+60	1.58	1.58	1.80	4.32	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+22+28+28	2.02	2.02	2.57	2.57	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+28+35	1.89	1.89	2.41	3.01	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+28+50	1.67	1.67	2.12	3.79	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+22+28+60	1.55	1.55	1.97	4.22	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+22+35+35	1.78	1.78	2.83	2.83	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+22+35+50	1.58	1.58	2.52	3.60	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2

Model SCM80ZF-S

(a) Heating

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
4 room	22+25+25+25	2.08	2.36	2.36	2.36	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+25+25+28	2.02	2.29	2.29	2.57	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+25+25+35	1.89	2.15	2.15	3.01	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+25+25+50	1.67	1.90	1.90	3.79	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+25+25+60	1.55	1.76	1.76	4.22	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+25+28+28	1.96	2.23	2.50	2.50	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+25+28+35	1.84	2.09	2.34	2.93	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+25+28+50	1.63	1.85	2.08	3.71	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+25+28+60	1.52	1.72	1.93	4.13	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+25+35+35	1.74	1.97	2.76	2.76	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+25+35+50	1.55	1.76	2.46	3.52	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+28+28+28	1.91	2.43	2.43	2.43	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+28+28+35	1.80	2.29	2.29	2.86	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+28+28+50	1.59	2.03	2.03	3.62	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+28+35+35	1.70	2.16	2.70	2.70	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	22+28+35+50	1.52	1.93	2.41	3.44	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	22+35+35+35	1.61	2.56	2.56	2.56	4.8	9.3	9.5	450	2430	2600	11.2	10.7	10.2
	25+25+25+25	2.29	2.29	2.29	2.29	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	25+25+25+28	2.23	2.23	2.23	2.50	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	25+25+25+35	2.09	2.09	2.09	2.93	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	25+25+25+50	1.85	1.85	1.85	3.71	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	25+25+25+60	1.72	1.72	1.72	4.13	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	25+25+28+28	2.17	2.17	2.43	2.43	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	25+25+28+35	2.04	2.04	2.29	2.86	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	25+25+28+50	1.81	1.81	2.03	3.62	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	25+25+35+35	1.93	1.93	2.70	2.70	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	25+25+35+50	1.72	1.72	2.41	3.44	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	28+28+28+28	2.30	2.30	2.30	2.30	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	28+28+28+35	2.18	2.18	2.18	2.72	4.8	9.2	9.5	450	2400	2600	11.0	10.5	10.1
	28+28+28+50	1.94	1.94	1.94	3.47	4.9	9.3	9.5	500	2430	2600	11.2	10.7	10.2
	28+28+35+35	2.06	2.06	2.58	2.58	4.8	9.3	9.5	450	2430	2600	11.2	10.7	10.2
	28+35+35+35	1.96	2.45	2.45	2.45	4.8	9.3	9.5	450	2430	2600	11.2	10.7	10.2

Model SCM80ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
1 room	20	2.0	–	–	–	1.0	2.0	2.4	280	680	920	3.1	3.0	2.9
	22	2.2	–	–	–	1.0	2.2	2.5	280	800	960	3.7	3.5	3.4
	25	2.5	–	–	–	1.0	2.5	2.6	280	960	1000	4.4	4.2	4.0
	28	2.8	–	–	–	1.0	2.8	3.1	280	1090	1215	5.0	4.8	4.6
	35	3.5	–	–	–	1.0	3.5	3.7	280	1480	1520	6.8	6.5	6.2
	50	5.0	–	–	–	1.0	5.0	5.3	280	2350	2450	10.8	10.3	9.9
	60	6.0	–	–	–	1.0	6.0	6.2	280	2950	3200	13.5	13.0	12.4
2 room	20+20	2.00	2.00	–	–	1.4	4.0	5.0	410	1430	2120	6.6	6.3	6.0
	20+22	2.00	2.20	–	–	1.4	4.2	5.2	410	1520	2160	7.0	6.7	6.4
	20+25	2.00	2.50	–	–	1.4	4.5	5.5	410	1650	2200	7.6	7.2	6.9
	20+28	2.00	2.80	–	–	1.4	4.8	5.8	410	1780	2450	8.2	7.8	7.5
	20+35	1.96	3.44	–	–	1.4	5.4	6.6	410	2050	2780	9.4	9.0	8.6
	20+50	1.97	4.93	–	–	1.6	6.9	7.6	490	2750	3200	12.6	12.1	11.6
	20+60	1.85	5.55	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	22+22	2.20	2.20	–	–	1.4	4.4	5.5	410	1600	2200	7.3	7.0	6.7
	22+25	2.20	2.50	–	–	1.4	4.7	5.7	410	1740	2260	8.0	7.6	7.3
	22+28	2.20	2.80	–	–	1.4	5.0	6.1	410	1870	2500	8.6	8.2	7.9
	22+35	2.16	3.44	–	–	1.4	5.6	6.8	410	2145	2840	9.8	9.4	9.0
	22+50	2.17	4.93	–	–	1.6	7.1	7.6	490	2850	3200	13.1	12.5	12.0
	22+60	1.99	5.41	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	25+25	2.50	2.50	–	–	1.4	5.0	5.8	410	1870	2300	8.6	8.2	7.9
	25+28	2.45	2.75	–	–	1.4	5.2	6.2	410	1960	2540	9.0	8.6	8.2
	25+35	2.46	3.44	–	–	1.4	5.9	6.9	410	2280	2880	10.5	10.0	9.6
	25+50	2.47	4.93	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	25+60	2.18	5.22	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	28+28	2.75	2.75	–	–	1.4	5.5	6.6	410	2100	2780	9.6	9.2	8.8
	28+35	2.76	3.44	–	–	1.4	6.2	7.4	410	2420	3200	11.1	10.6	10.2
	28+50	2.66	4.74	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	28+60	2.35	5.05	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	35+35	3.45	3.45	–	–	1.4	6.9	7.6	410	2750	3200	12.6	12.1	11.6
	35+50	3.05	4.35	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	35+60	2.73	4.67	–	–	1.6	7.4	7.6	490	2990	3200	13.7	13.1	12.6
	50+50	3.70	3.70	–	–	1.8	7.4	7.6	560	2990	3200	13.7	13.1	12.6
	50+60	3.36	4.04	–	–	1.8	7.4	7.6	560	2990	3200	13.7	13.1	12.6
3 room	20+20+20	2.00	2.00	2.00	–	2.2	6.0	8.6	680	2010	3200	9.2	8.8	8.5
	20+20+22	2.00	2.00	2.20	–	2.2	6.2	8.6	680	2100	3200	9.6	9.2	8.8
	20+20+25	2.00	2.00	2.50	–	2.2	6.5	8.6	680	2190	3200	10.1	9.6	9.2
	20+20+28	1.95	1.95	2.73	–	2.2	6.6	8.6	680	2330	3200	10.7	10.2	9.8
	20+20+35	1.90	1.90	3.33	–	2.2	7.1	8.6	680	2610	3200	12.0	11.5	11.0
	20+20+50	1.73	1.73	4.33	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+20+60	1.56	1.56	4.68	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+22+22	1.98	2.18	2.18	–	2.2	6.3	8.6	680	2145	3200	9.8	9.4	9.0
	20+22+25	1.96	2.15	2.45	–	2.2	6.6	8.6	680	2280	3200	10.5	10.0	9.6
	20+22+28	1.94	2.13	2.71	–	2.2	6.8	8.6	680	2420	3200	11.1	10.6	10.2
	20+22+35	1.89	2.08	3.31	–	2.2	7.3	8.6	680	2660	3200	12.2	11.7	11.2
	20+22+50	1.70	1.87	4.24	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+22+60	1.53	1.68	4.59	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+25+25	1.94	2.42	2.42	–	2.2	6.8	8.6	680	2420	3200	11.1	10.6	10.2
	20+25+28	1.92	2.40	2.68	–	2.2	7.0	8.6	680	2515	3200	11.5	11.0	10.6
	20+25+35	1.88	2.34	3.28	–	2.2	7.5	8.6	680	2800	3200	12.9	12.3	11.8
	20+25+50	1.64	2.05	4.11	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+25+60	1.49	1.86	4.46	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+28+28	1.90	2.66	2.66	–	2.2	7.2	8.6	680	2660	3200	12.2	11.7	11.2
	20+28+35	1.86	2.60	3.25	–	2.2	7.7	8.6	680	2890	3200	13.3	12.7	12.2
	20+28+50	1.59	2.23	3.98	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+28+60	1.44	2.02	4.33	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+35+35	1.73	3.03	3.03	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	20+35+50	1.49	2.60	3.71	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+35+60	1.36	2.37	4.07	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	20+50+50	1.30	3.25	3.25	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
	20+50+60	1.20	3.00	3.60	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2

Model SCM80ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
3 room	22+22+22	2.16	2.16	2.16	–	2.2	6.5	8.6	680	2240	3200	10.3	9.8	9.4
	22+22+25	2.14	2.14	2.43	–	2.2	6.7	8.6	680	2375	3200	10.9	10.4	10.0
	22+22+28	2.12	2.12	2.69	–	2.2	6.9	8.6	680	2470	3200	11.3	10.8	10.4
	22+22+35	2.07	2.07	3.29	–	2.2	7.4	8.6	680	2750	3200	12.6	12.1	11.6
	22+22+50	1.83	1.83	4.15	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+22+60	1.65	1.65	4.50	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+25+25	2.12	2.40	2.40	–	2.2	6.9	8.6	680	2470	3200	11.3	10.8	10.4
	22+25+28	2.09	2.38	2.67	–	2.2	7.1	8.6	680	2610	3200	12.0	11.5	11.0
	22+25+35	2.05	2.33	3.26	–	2.2	7.6	8.6	680	2890	3200	13.3	12.7	12.2
	22+25+50	1.77	2.01	4.02	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+25+60	1.60	1.82	4.37	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+28+28	2.07	2.64	2.64	–	2.2	7.4	8.6	680	2710	3200	12.4	11.9	11.4
	22+28+35	2.02	2.57	3.21	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	22+28+50	1.72	2.18	3.90	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+28+60	1.56	1.99	4.25	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+35+35	1.87	2.97	2.97	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	22+35+50	1.60	2.55	3.64	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+35+60	1.47	2.33	4.00	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	22+50+50	1.41	3.20	3.20	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
	22+50+60	1.30	2.95	3.55	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
	25+25+25	2.38	2.38	2.38	–	2.2	7.1	8.6	680	2610	3200	12.0	11.5	11.0
	25+25+28	2.36	2.36	2.64	–	2.2	7.4	8.6	680	2710	3200	12.4	11.9	11.4
	25+25+35	2.29	2.29	3.21	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	25+25+50	1.95	1.95	3.90	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	25+25+60	1.77	1.77	4.25	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	25+28+28	2.34	2.62	2.62	–	2.2	7.6	8.6	680	2850	3200	13.1	12.5	12.0
	25+28+35	2.22	2.48	3.10	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	25+28+50	1.89	2.12	3.79	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	25+28+60	1.73	1.93	4.14	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	25+35+35	2.05	2.87	2.87	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	25+35+50	1.77	2.48	3.55	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	25+35+60	1.63	2.28	3.90	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	25+50+50	1.56	3.12	3.12	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
	25+50+60	1.44	2.89	3.47	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
	28+28+28	2.60	2.60	2.60	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	28+28+35	2.40	2.40	3.00	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	28+28+50	2.06	2.06	3.68	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	28+28+60	1.88	1.88	4.03	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	28+35+35	2.23	2.79	2.79	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	28+35+50	1.93	2.42	3.45	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	28+35+60	1.78	2.22	3.80	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	28+50+50	1.71	3.05	3.05	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
	35+35+35	2.60	2.60	2.60	–	2.2	7.8	8.6	680	2890	3200	13.3	12.7	12.2
	35+35+50	2.28	2.28	3.25	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	35+35+60	2.10	2.10	3.60	–	2.5	7.8	8.6	750	2890	3200	13.3	12.7	12.2
	35+50+50	2.02	2.89	2.89	–	2.7	7.8	8.6	830	2890	3200	13.3	12.7	12.2
4 room	20+20+20+20	1.95	1.95	1.95	1.95	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+20+22	1.90	1.90	1.90	2.09	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+20+25	1.84	1.84	1.84	2.30	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+20+28	1.78	1.78	1.78	2.49	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+20+35	1.65	1.65	1.65	2.89	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+20+20+50	1.44	1.44	1.44	3.60	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	20+20+20+60	1.32	1.32	1.32	3.97	2.7	7.9	9.3	1040	2430	3200	11.2	10.7	10.2
	20+20+22+22	1.86	1.86	2.05	2.05	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+22+25	1.80	1.80	1.98	2.25	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+22+28	1.74	1.74	1.92	2.44	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+22+35	1.62	1.62	1.78	2.84	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+20+22+50	1.41	1.41	1.56	3.53	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	20+20+22+60	1.30	1.30	1.43	3.91	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+20+25+25	1.74	1.74	2.18	2.18	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+20+25+28	1.69	1.69	2.11	2.36	2.5	7.8	9.3	960	2380	3200	10.9	10.5	10.0

Model SCM80ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
4 room	20+20+25+35	1.57	1.57	1.97	2.76	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+20+25+50	1.38	1.38	1.72	3.45	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	20+20+25+60	1.27	1.27	1.59	3.82	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+20+28+28	1.64	1.64	2.29	2.29	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+20+28+35	1.53	1.53	2.14	2.68	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+20+28+50	1.35	1.35	1.88	3.36	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	20+20+28+60	1.25	1.25	1.74	3.74	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+20+35+35	1.44	1.44	2.52	2.52	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+20+35+50	1.28	1.28	2.24	3.20	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+20+35+60	1.19	1.19	2.07	3.56	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+22+22+22	1.82	2.00	2.00	2.00	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+22+22+25	1.76	1.94	1.94	2.20	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	20+22+22+28	1.71	1.88	1.88	2.39	2.5	7.8	9.3	960	2380	3200	10.9	10.5	10.0
	20+22+22+35	1.59	1.75	1.75	2.78	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+22+22+50	1.39	1.53	1.53	3.48	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	20+22+22+60	1.28	1.41	1.41	3.85	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+22+25+25	1.71	1.88	2.13	2.13	2.5	7.8	9.3	960	2380	3200	10.9	10.5	10.0
	20+22+25+28	1.65	1.82	2.07	2.32	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+22+25+35	1.55	1.70	1.93	2.70	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+22+25+50	1.36	1.49	1.70	3.39	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	20+22+25+60	1.26	1.38	1.57	3.77	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+22+28+28	1.61	1.77	2.25	2.25	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+22+28+35	1.50	1.65	2.10	2.63	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+22+28+50	1.32	1.46	1.85	3.31	2.7	7.9	9.3	1040	2430	3200	11.2	10.7	10.2
	20+22+28+60	1.23	1.35	1.72	3.68	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+22+35+35	1.41	1.56	2.47	2.47	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+22+35+50	1.26	1.38	2.20	3.14	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+25+25+25	1.65	2.07	2.07	2.07	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+25+25+28	1.61	2.01	2.01	2.25	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+25+25+35	1.50	1.88	1.88	2.63	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+25+25+50	1.32	1.66	1.66	3.31	2.7	7.9	9.3	1040	2430	3200	11.2	10.7	10.2
	20+25+25+60	1.23	1.53	1.53	3.68	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+25+28+28	1.56	1.95	2.18	2.18	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	20+25+28+35	1.46	1.83	2.05	2.56	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+25+28+50	1.29	1.62	1.81	3.23	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+25+28+60	1.20	1.50	1.68	3.61	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+25+35+35	1.38	1.72	2.41	2.41	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+25+35+50	1.23	1.53	2.15	3.07	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+28+28+28	1.52	2.12	2.12	2.12	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+28+28+35	1.43	2.00	2.00	2.50	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+28+28+50	1.26	1.77	1.77	3.16	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+28+35+35	1.35	1.88	2.35	2.35	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	20+28+35+50	1.20	1.68	2.10	3.00	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	20+35+35+35	1.27	2.23	2.23	2.23	2.5	8.0	9.3	960	2430	3200	11.2	10.7	10.2
	22+22+22+22	1.96	1.96	1.96	1.96	2.5	7.8	9.3	960	2350	3200	10.8	10.3	9.9
	22+22+22+25	1.90	1.90	1.90	2.15	2.5	7.8	9.3	960	2380	3200	10.9	10.5	10.0
	22+22+22+28	1.84	1.84	1.84	2.34	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+22+22+35	1.72	1.72	1.72	2.73	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+22+22+50	1.50	1.50	1.50	3.42	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	22+22+22+60	1.39	1.39	1.39	3.79	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+22+25+25	1.84	1.84	2.09	2.09	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+22+25+28	1.78	1.78	2.03	2.27	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+22+25+35	1.67	1.67	1.90	2.65	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+22+25+50	1.47	1.47	1.67	3.34	2.7	7.9	9.3	1040	2400	3200	11.0	10.5	10.1
	22+22+25+60	1.36	1.36	1.55	3.71	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+22+28+28	1.73	1.73	2.20	2.20	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+22+28+35	1.62	1.62	2.07	2.58	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+22+28+50	1.43	1.43	1.83	3.26	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+22+28+60	1.33	1.33	1.69	3.63	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+22+35+35	1.53	1.53	2.43	2.43	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+22+35+50	1.36	1.36	2.16	3.09	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2

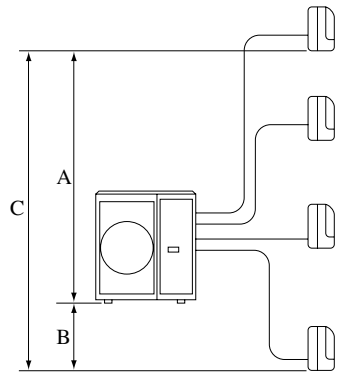
Model SCM80ZF-S

(b) Cooling

Indoor unit combination		Cooling capacity (kW)							Power consumption (W)			Standard current (A)		
		Room cooling capacity (kW)				Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	D room	Min.	Standard	Max.						
4 room	22+25+25+25	1.78	2.03	2.03	2.03	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+25+25+28	1.73	1.97	1.97	2.20	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+25+25+35	1.62	1.85	1.85	2.58	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+25+25+50	1.43	1.63	1.63	3.26	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+25+25+60	1.33	1.51	1.51	3.63	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+25+28+28	1.68	1.91	2.14	2.14	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	22+25+28+35	1.58	1.80	2.01	2.52	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+25+28+50	1.40	1.59	1.78	3.19	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+25+28+60	1.30	1.48	1.66	3.56	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+25+35+35	1.49	1.70	2.37	2.37	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+25+35+50	1.33	1.51	2.12	3.03	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+28+28+28	1.64	2.09	2.09	2.09	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+28+28+35	1.54	1.96	1.96	2.45	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	22+28+28+50	1.37	1.74	1.74	3.12	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+28+35+35	1.46	1.85	2.32	2.32	2.5	7.9	9.3	960	2430	3200	11.2	10.7	10.2
	22+28+35+50	1.30	1.66	2.07	2.96	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	22+35+35+35	1.38	2.20	2.20	2.20	2.5	8.0	9.3	960	2430	3200	11.2	10.7	10.2
	25+25+25+25	1.97	1.97	1.97	1.97	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	25+25+25+28	1.91	1.91	1.91	2.14	2.5	7.9	9.3	960	2380	3200	10.9	10.5	10.0
	25+25+25+35	1.80	1.80	1.80	2.52	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	25+25+25+50	1.59	1.59	1.59	3.19	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	25+25+25+60	1.48	1.48	1.48	3.56	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	25+25+28+28	1.86	1.86	2.09	2.09	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	25+25+28+35	1.75	1.75	1.96	2.45	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	25+25+28+50	1.56	1.56	1.74	3.12	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	25+25+35+35	1.66	1.66	2.32	2.32	2.5	7.9	9.3	960	2430	3200	11.2	10.7	10.2
	25+25+35+50	1.48	1.48	2.07	2.96	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	28+28+28+28	1.98	1.98	1.98	1.98	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	28+28+28+35	1.87	1.87	1.87	2.34	2.5	7.9	9.3	960	2400	3200	11.0	10.5	10.1
	28+28+28+50	1.67	1.67	1.67	2.98	2.7	8.0	9.3	1040	2430	3200	11.2	10.7	10.2
	28+28+35+35	1.77	1.77	2.21	2.21	2.5	8.0	9.3	960	2430	3200	11.2	10.7	10.2
	28+35+35+35	1.68	2.10	2.10	2.10	2.5	8.0	9.3	960	2430	3200	11.2	10.7	10.2

2.2 Range of usage & limitations

Item \ Models		SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
Indoor intake air temperature (Upper, lower limits)	Cooling	18 to 32°C	21 to 32°C	18 to 32°C	21 to 32°C	18 to 32°C
	Heating	15 to 30°C				
Outdoor air temperature (Upper, lower limits)	Cooling	-15 to 43°C	21 to 43°C	-15 to 43°C	21 to 43°C	-15 to 43°C
	Heating	-15 to 24°C	-10 to 24°C	-15 to 24°C	-10 to 24°C	-15 to 24°C
Indoor units that can be used in combination	Number of connected units	1 to 2 units		2 to 3 units		3 to 4 units
	Total of indoor Units (class kW)	5.6kW	7.0kW	8.5kW	11.0kW	13.5kW
Total length for all rooms		Max. 30m		Max. 40m		Max. 70m
Length for one indoor unit		Max. 25m				
Difference in height between indoor and outdoor units	When above outdoor unit (B)	15m	10m	15m	10m	20m
	When below outdoor unit (A)	15m				20m
Difference in height between indoor units (C)		Max. 25m				
Compressor stop/start frequency	1 cycle time	6 min or more (from stop to stop or from start to start)				
	Stop time	3 min or more				
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage				
	Voltage drop during start	Within ±15% of rated voltage				
	Interval unbalance	Within ±3% of rated voltage				

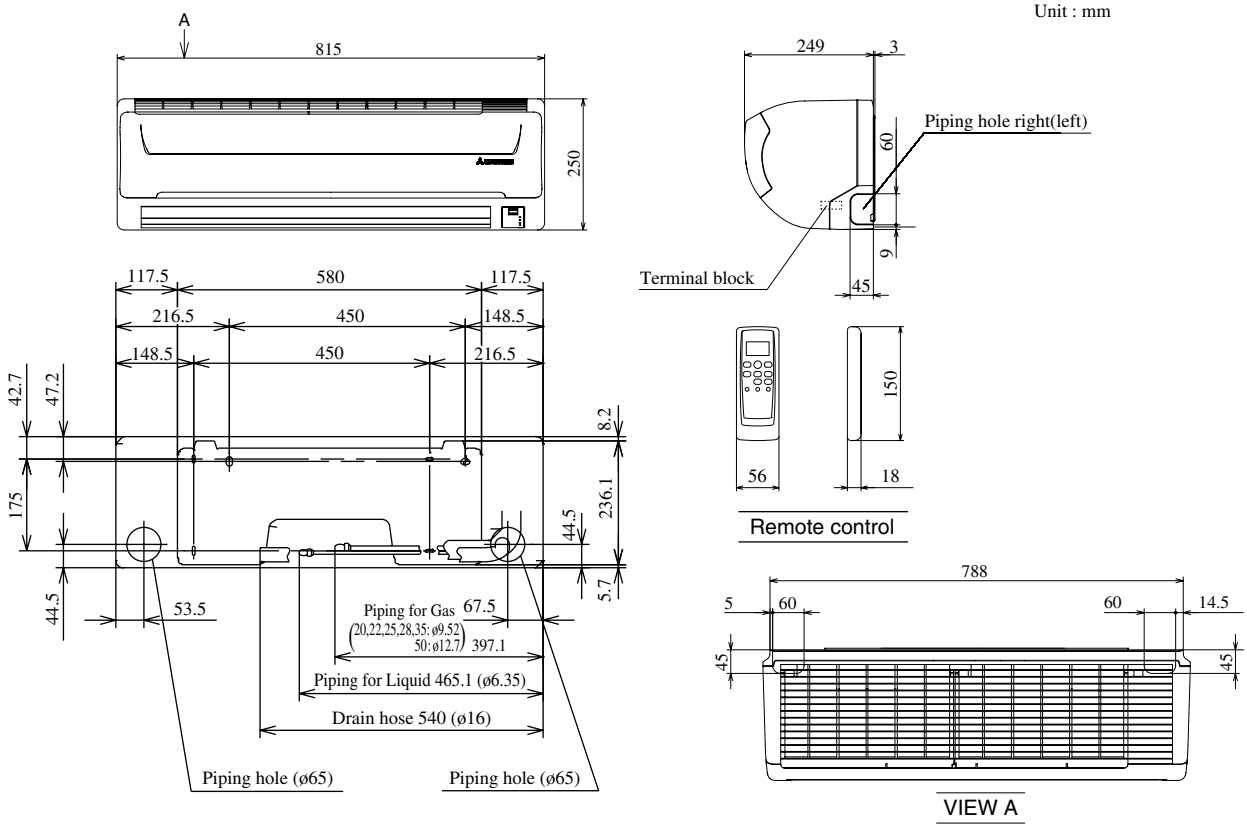


2.3 Exterior dimensions

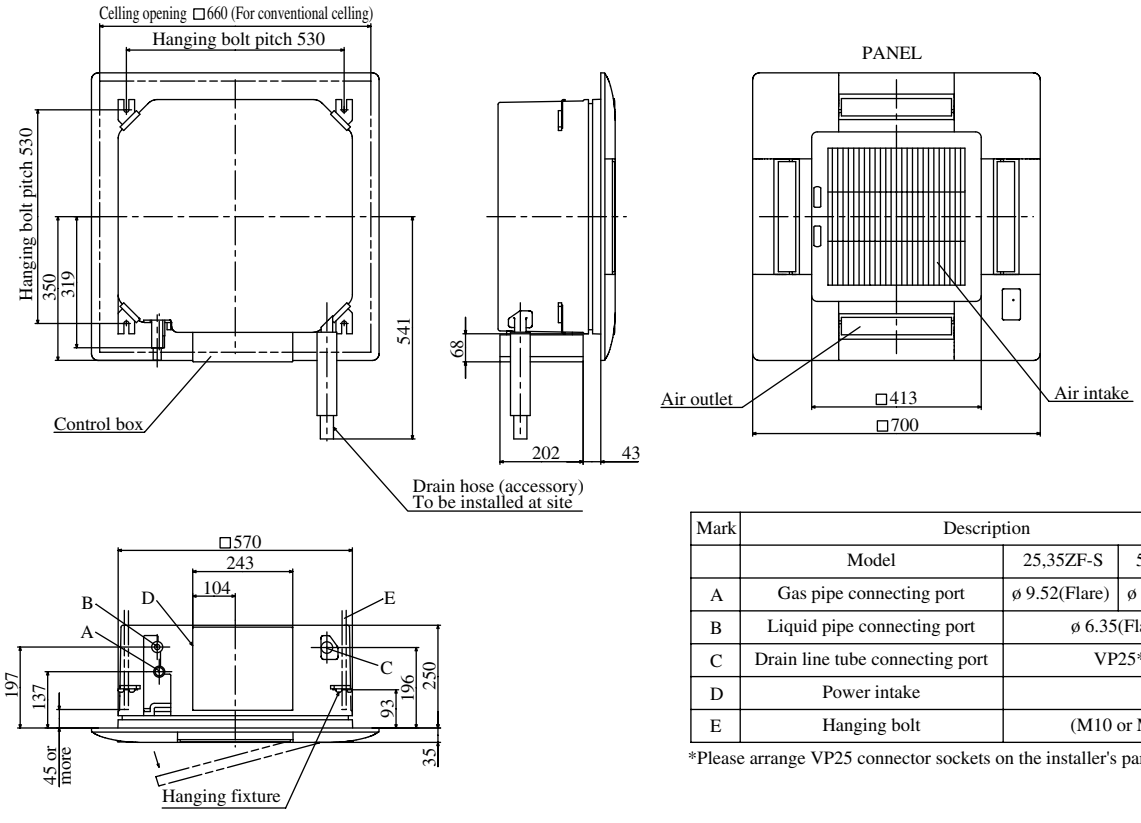
(1) Indoor unit

Models SKM20ZF-S, 22ZF-S, 25ZF-S, 28ZF-S, 35ZF-S, 50ZF-S

Unit : mm



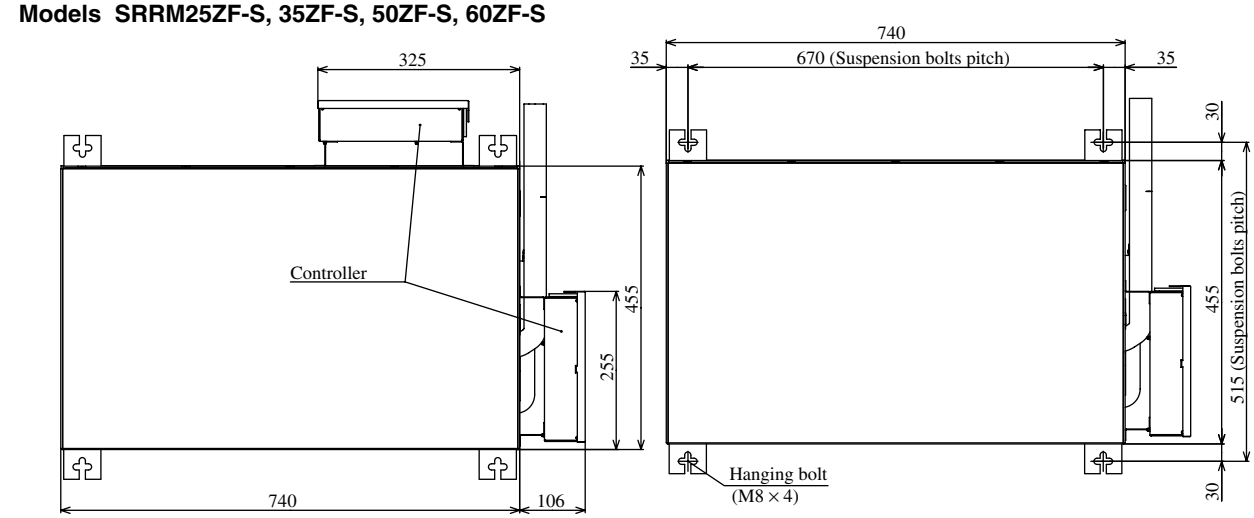
Models STM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S



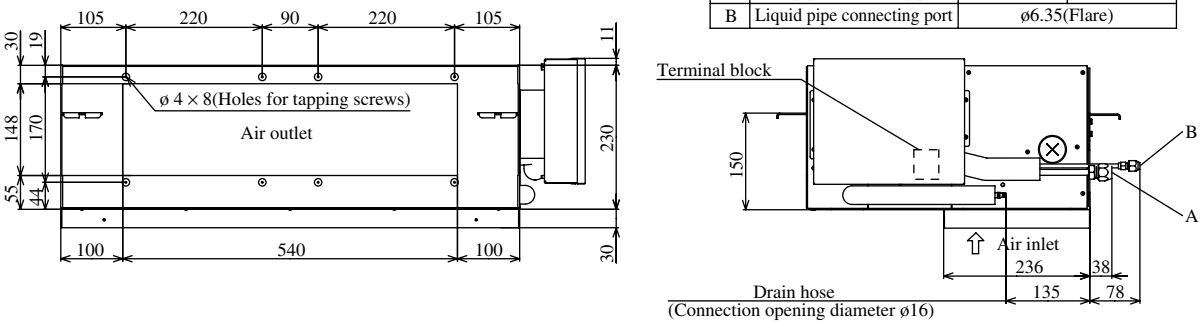
Mark	Description		
	Model	25,35ZF-S	50,60ZF-S
A	Gas pipe connecting port	ø 9.52(Flare)	ø 12.7(Flare)
B	Liquid pipe connecting port	ø 6.35(Flare)	
C	Drain line tube connecting port	VP25*	
D	Power intake		
E	Hanging bolt	(M10 or M8)	

*Please arrange VP25 connector sockets on the installer's part.

Models SRRM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S



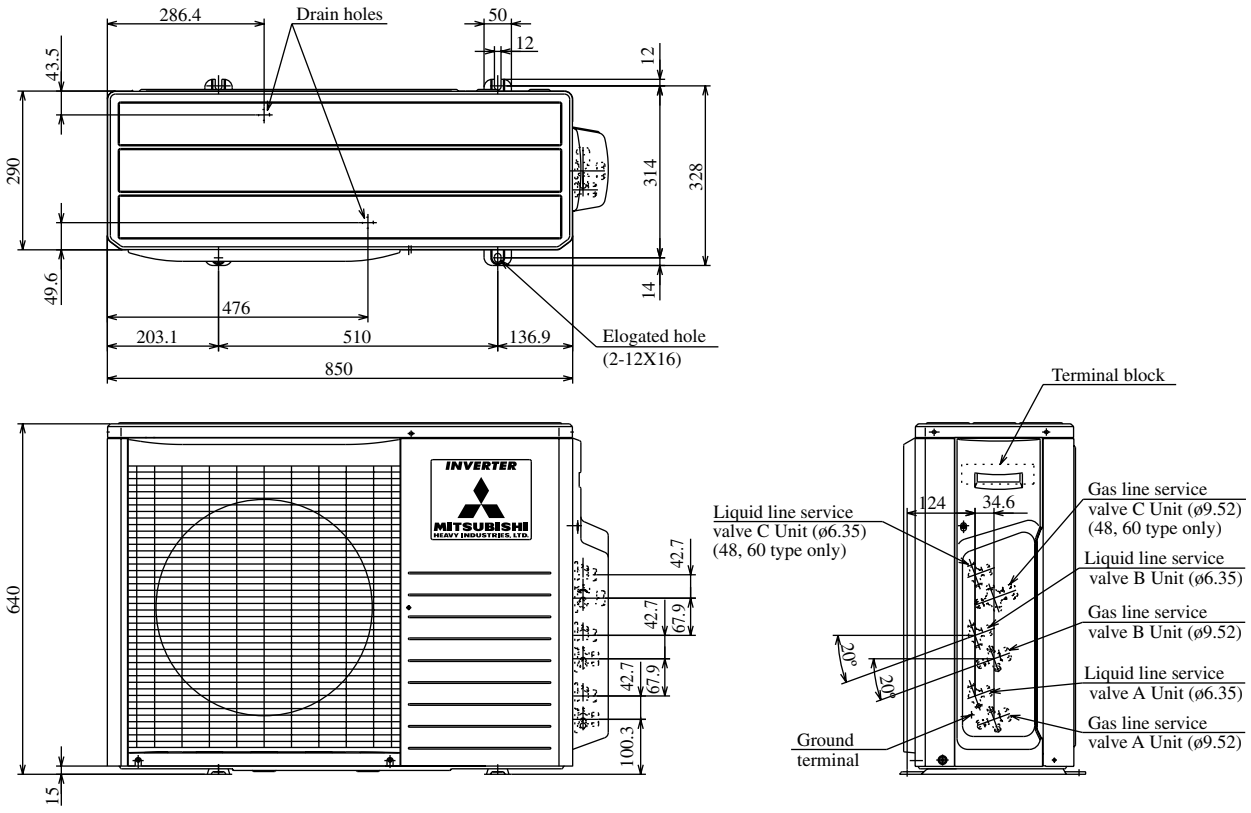
Mark	Description		
	Model	25,35ZF-S	50,60ZF-S
A	Gas pipe connecting port	ø9.52(Flare)	ø12.7(Flare)
B	Liquid pipe connecting port	ø6.35(Flare)	



(2) Outdoor unit

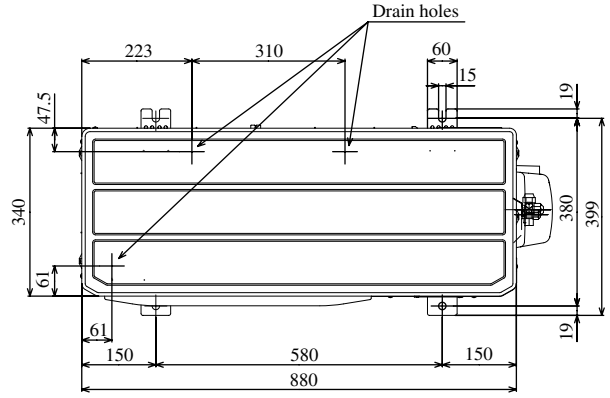
Models SCM40ZF-S, 45ZF-S, 48ZF-S, 60ZF-S

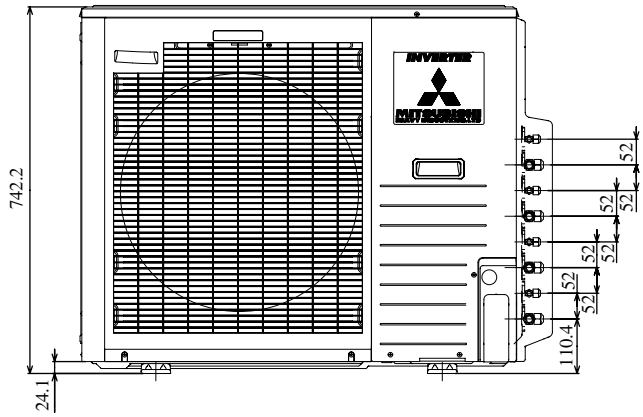
Unit : mm

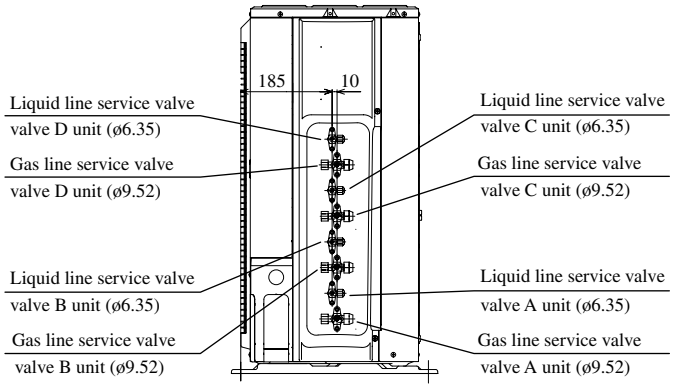


Model SCM80ZF-S

Unit : mm

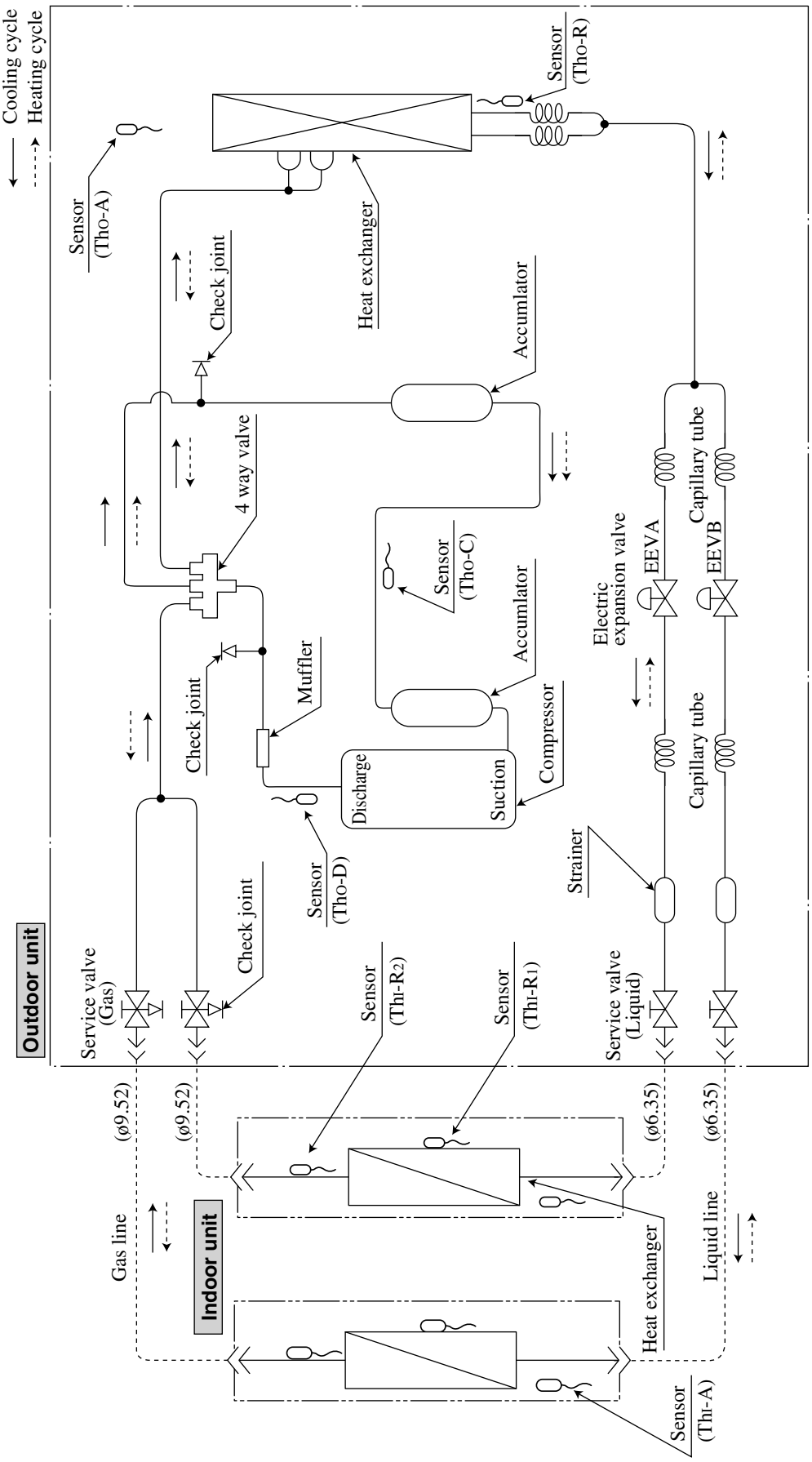




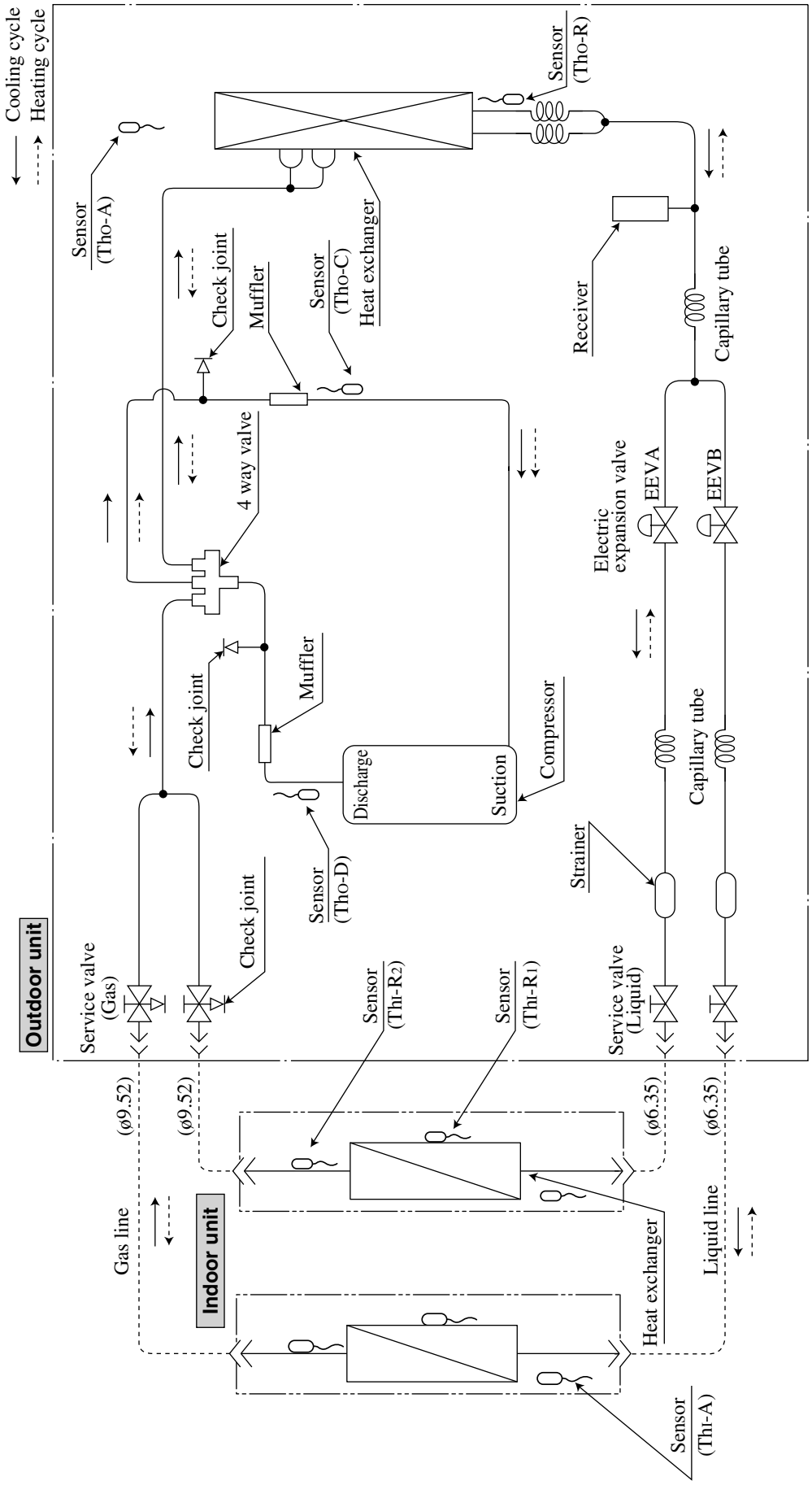


2.4 Piping system

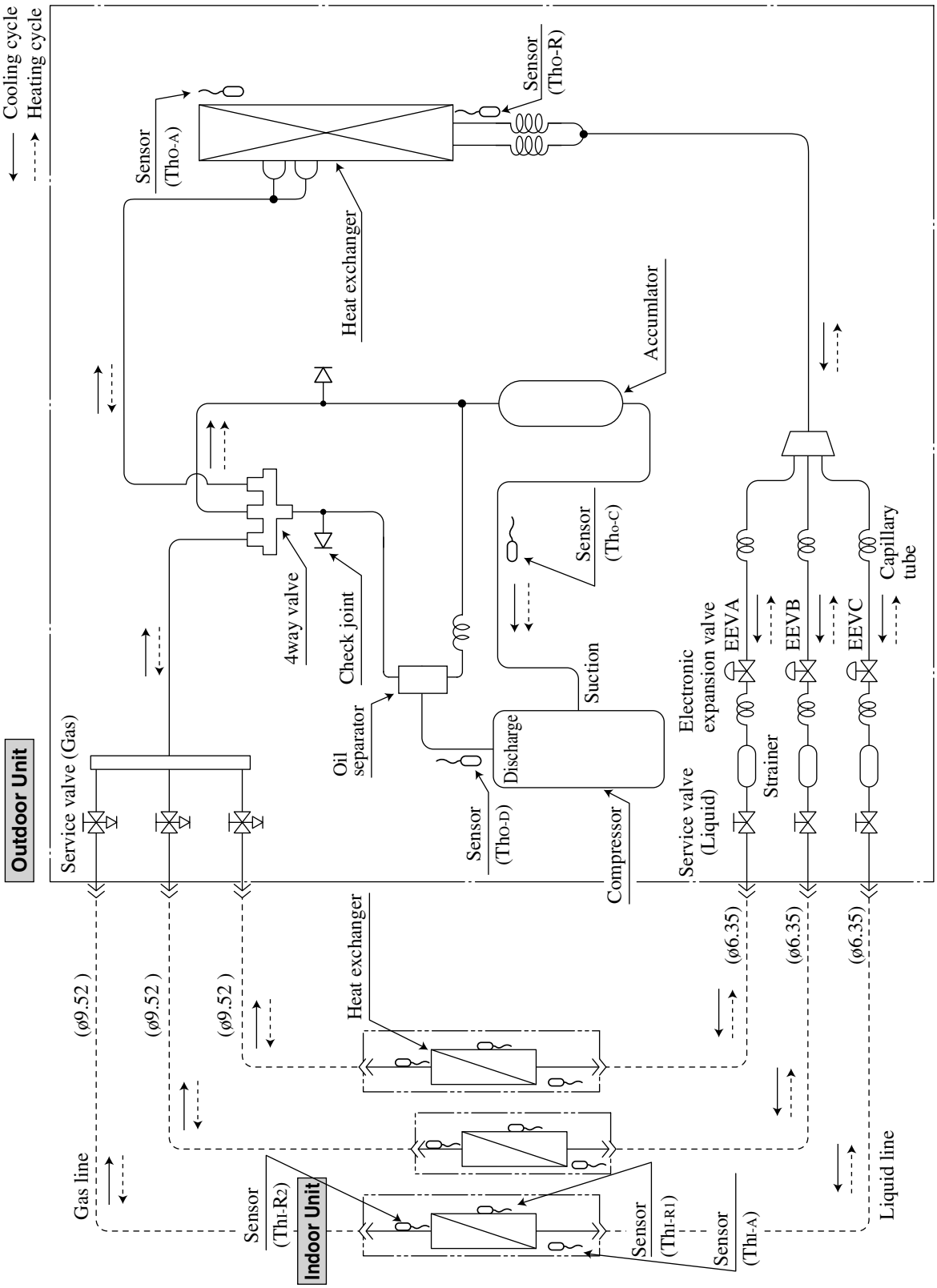
Model SCM40ZF-S



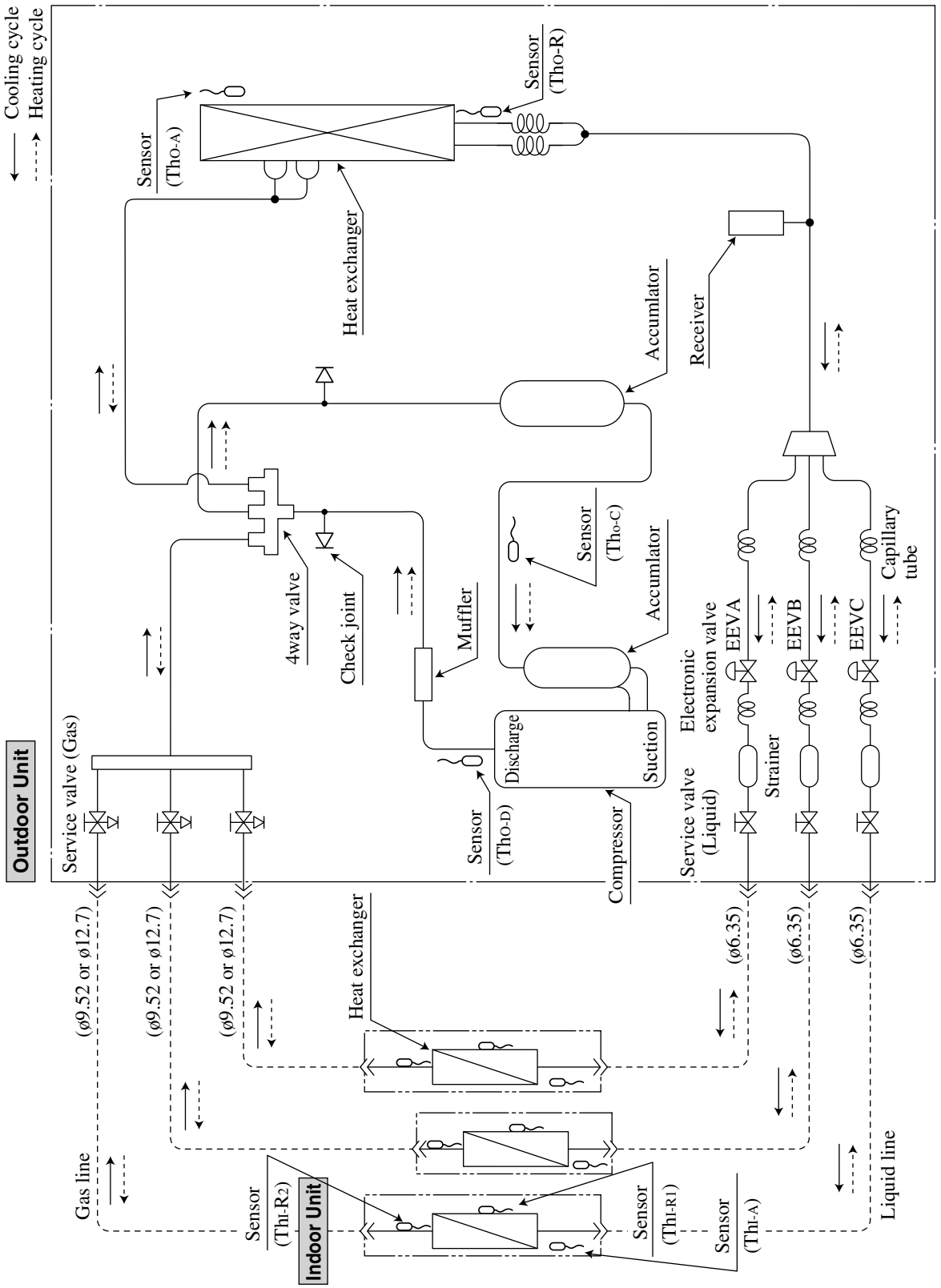
Models SCM45ZF-S



Models SCM48ZF-S

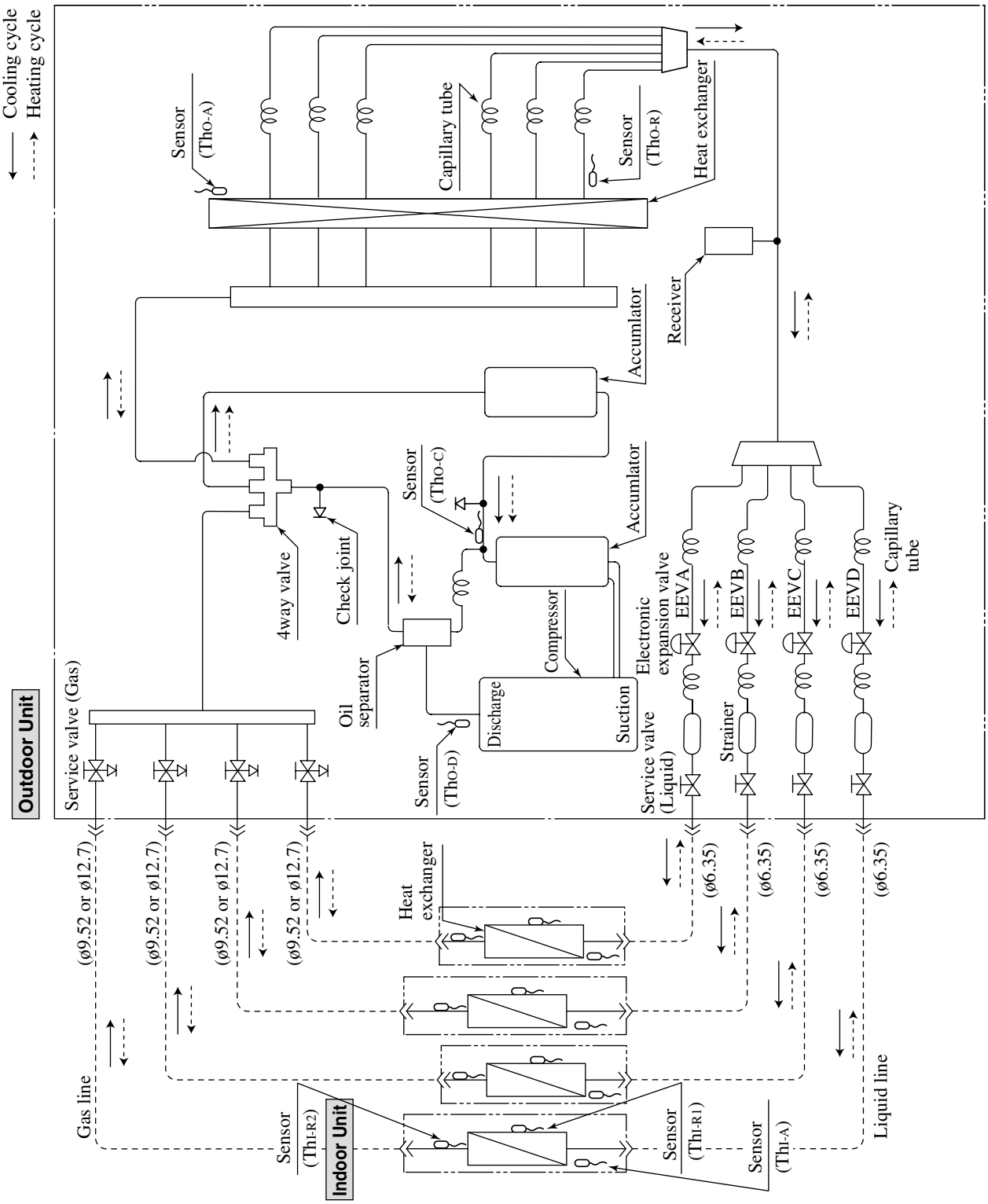


Model SCM60ZF-S



Gas line 22, 25, 28, 35 type : ø9.52
50, 60 type : ø12.7

Model SCM80ZF-S



Gas line 22, 25, 28, 35 type : ø9.52
50, 60 type : ø12.7

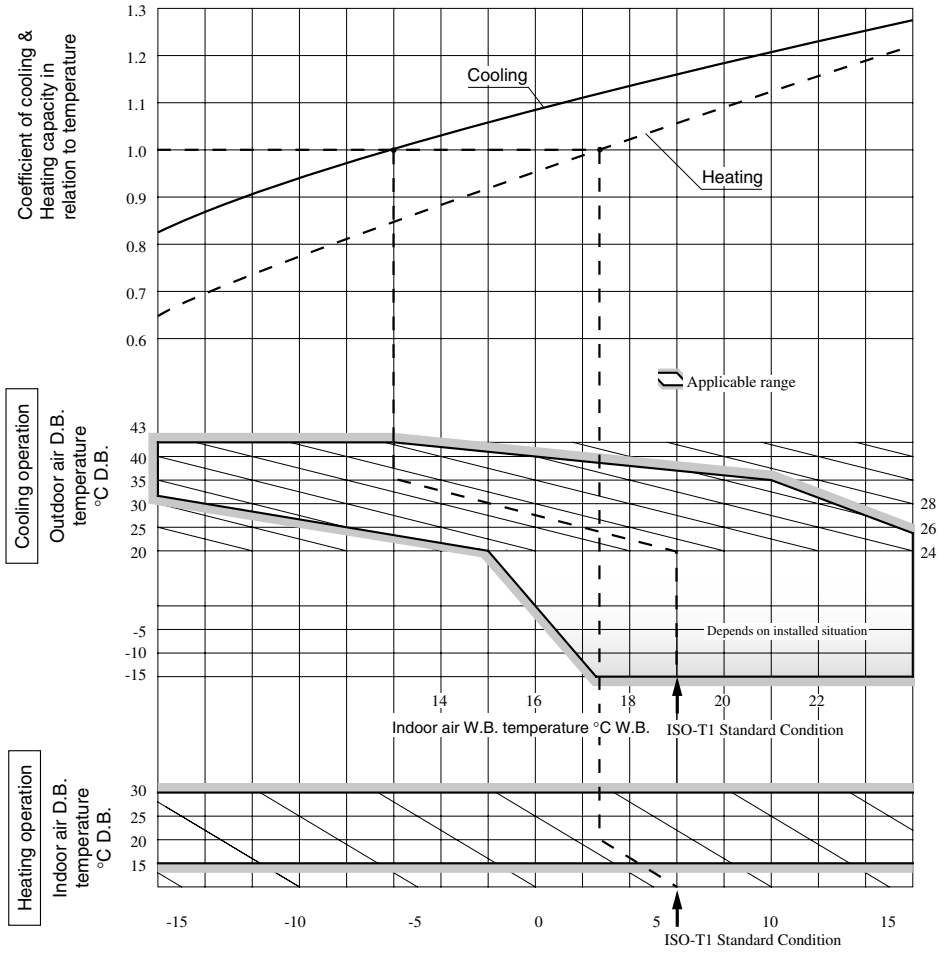
2.5 Selection chart

Correct the cooling and heating capacity in accordance with the conditions as follows. The net cooling and heating capacity can be obtained in the following way.

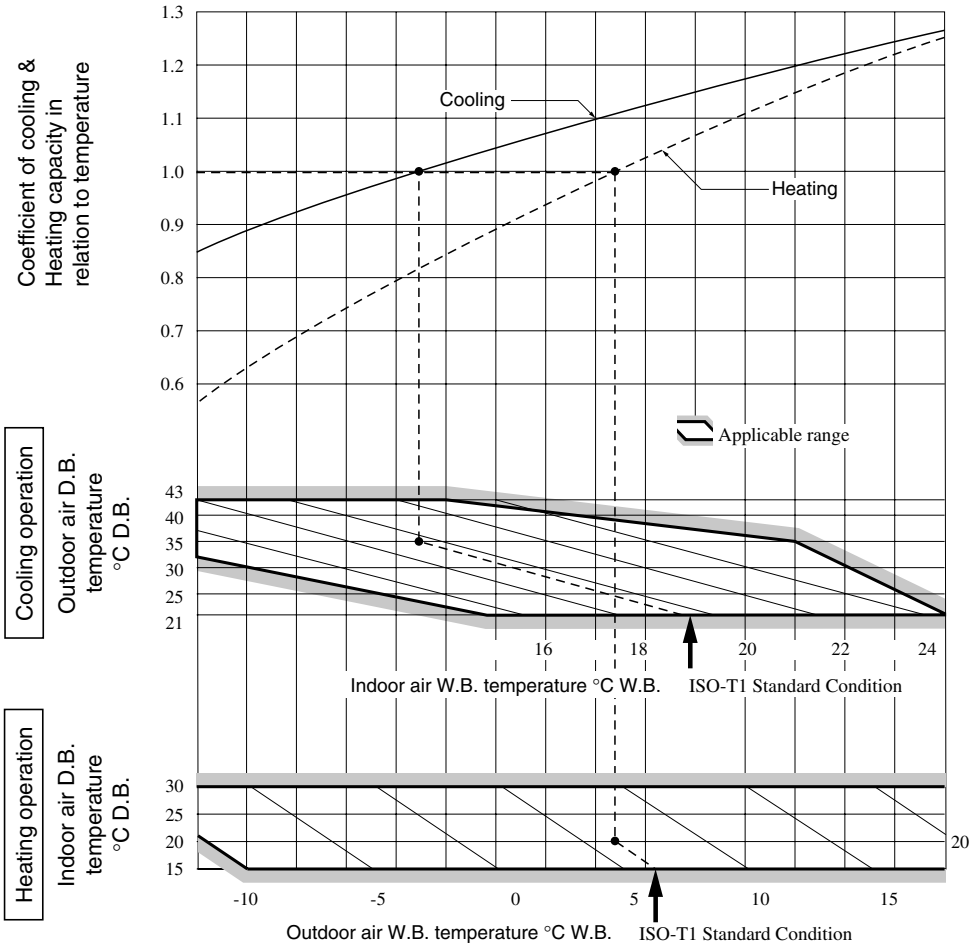
Net capacity = Capacity shown on specification × Correction factors as follows.

(1) Coefficient of cooling and heating capacity in relation to temperatures

SCM40ZF-S, 48ZF-S, 80ZF-S,



SCM45ZF-S, 60ZF-S



(2) Correction of cooling and heating capacity in relation to one way length of refrigerant piping

It is necessary to correct the cooling and heating capacity in relation to the one way piping length between the indoor and outdoor units.

Piping length [m]	7	10	15	20	25
Cooling	1.0	0.99	0.975	0.965	0.95
Heating	1.0	1.0	1.0	1.0	1.0

(3) Correction relative to frosting on outdoor heat exchanger during heating

In additions to the foregoing corrections (1), (2) the heating capacity needs to be adjusted also with respect to the frosting on the outdoor heat exchanger.

Air inlet temperature of outdoor unit in ºCWB	-10	-9	-7	-5	-3	-1	1	3	5
Adjustment coefficient	0.95	0.94	0.93	0.91	0.88	0.86	0.87	0.92	1.00

3 ELECTRICAL DATA

Meaning of marks

• Outdoor Unit

Symbol	Parts name	Symbol	Parts name
CM	Compressor motor	EEVA ~ D	Electronic expansion valve
FM_O	Fan motor	20S	4 way valve (coil)
CF_O	Capacitor (for FM_O)	Tho-A	Sensor (outdoor air temp.)
L	Reactor	Tho-R	Sensor (outdoor H.X temp.)
DS1	Diode stack	Tho-D	Sensor (discharge pipe temp.)
Q11	Power transistor	Tho-C	Sensor (suction pipe temp.)

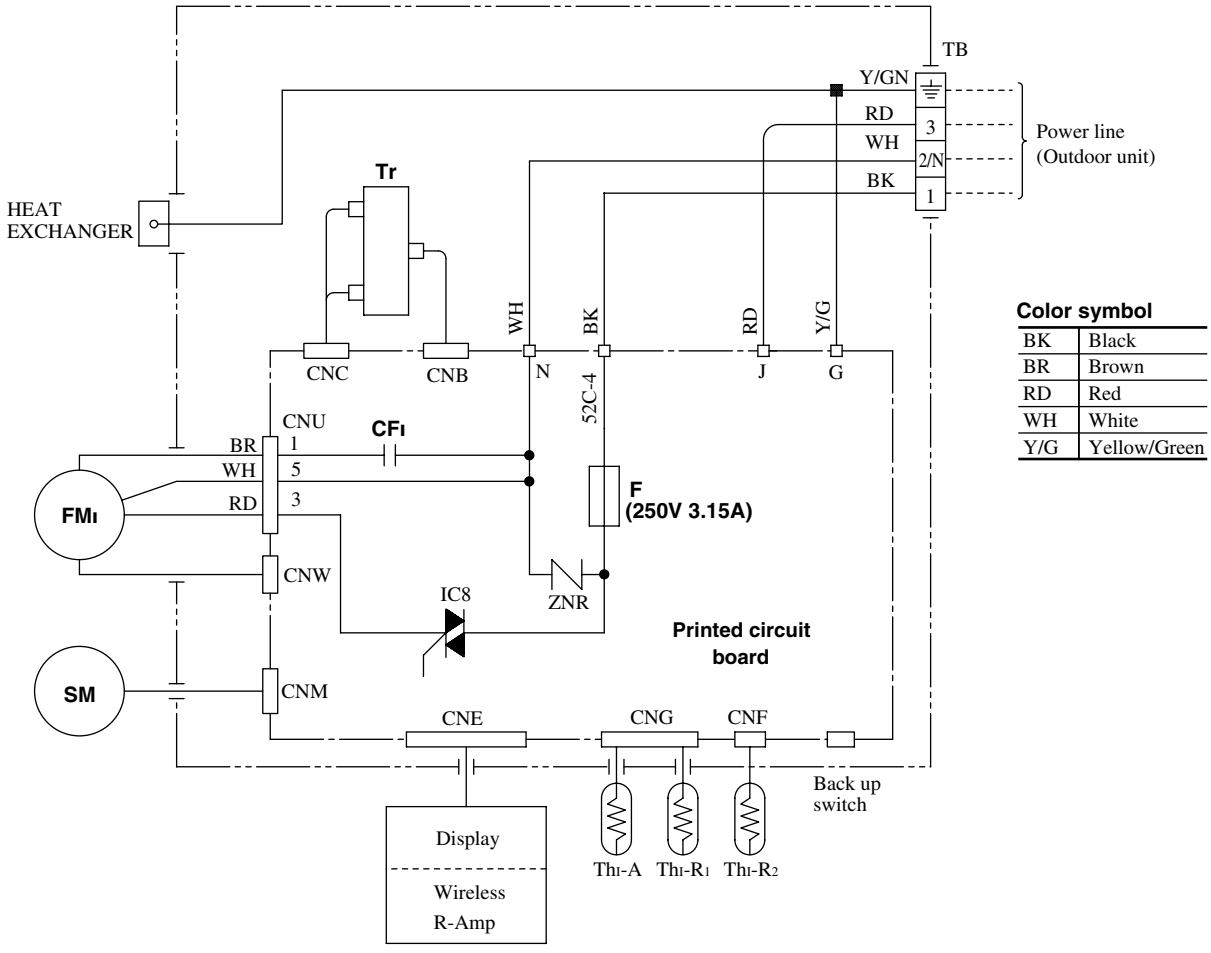
• Indoor Unit

Symbol	Parts name	Symbol	Parts name
FM_I	Fan motor	DM	Drain motor
CF_I	Capacitor (for FM_I)	FS	Float switch
SM	Flap motor	Th_I-A	Sensor (room temp.)
Tr	Transformer	Th_I-R_1	Sensor (indoor H.X temp.)
ZNR	Varistor	Th_I-R_2	Sensor (indoor H.X temp.)
F	Fuse		

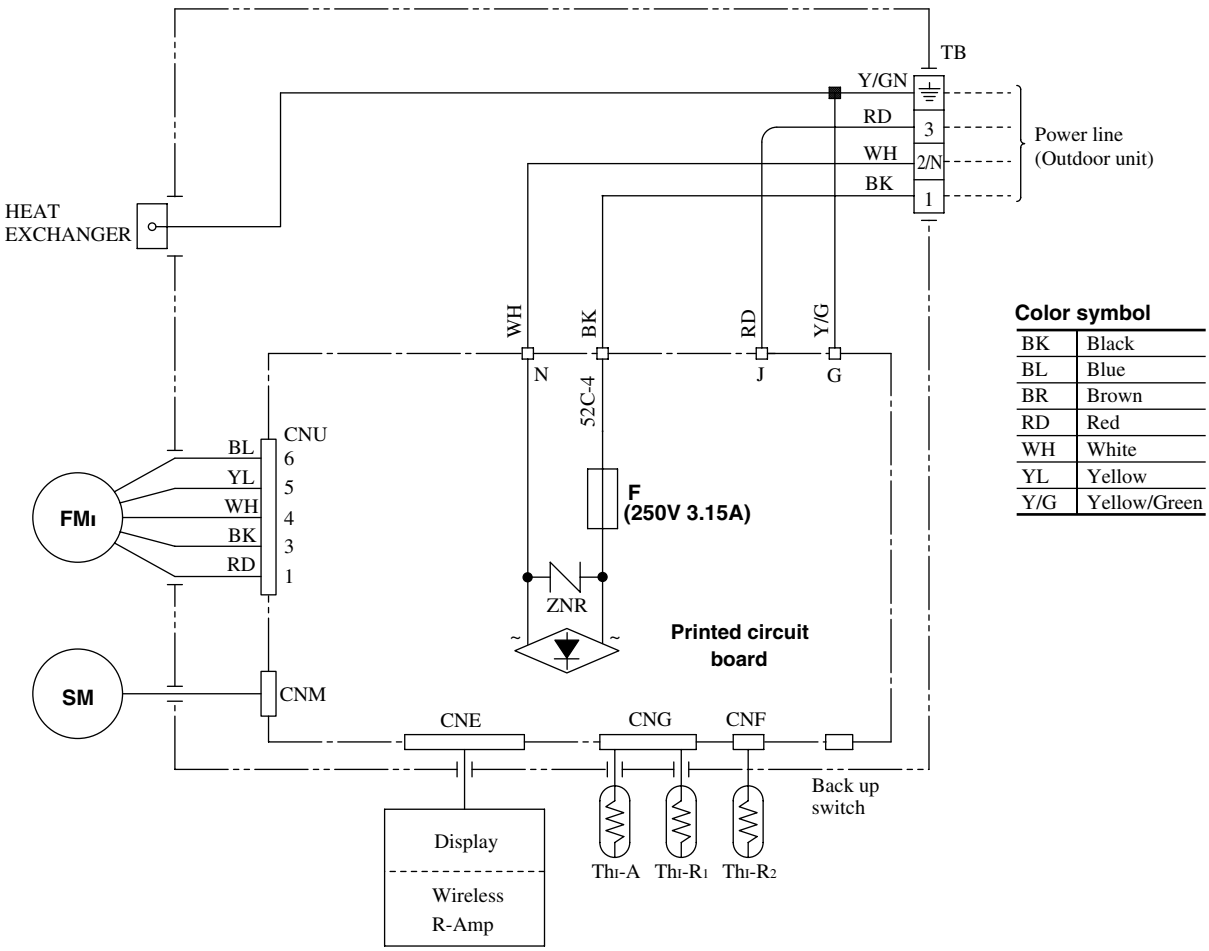
3.1 Electrical wiring

(1) Indoor unit

Models SKM20ZF-S, 22ZF-S, 25ZF-S, 28ZF-S, 35ZF-S



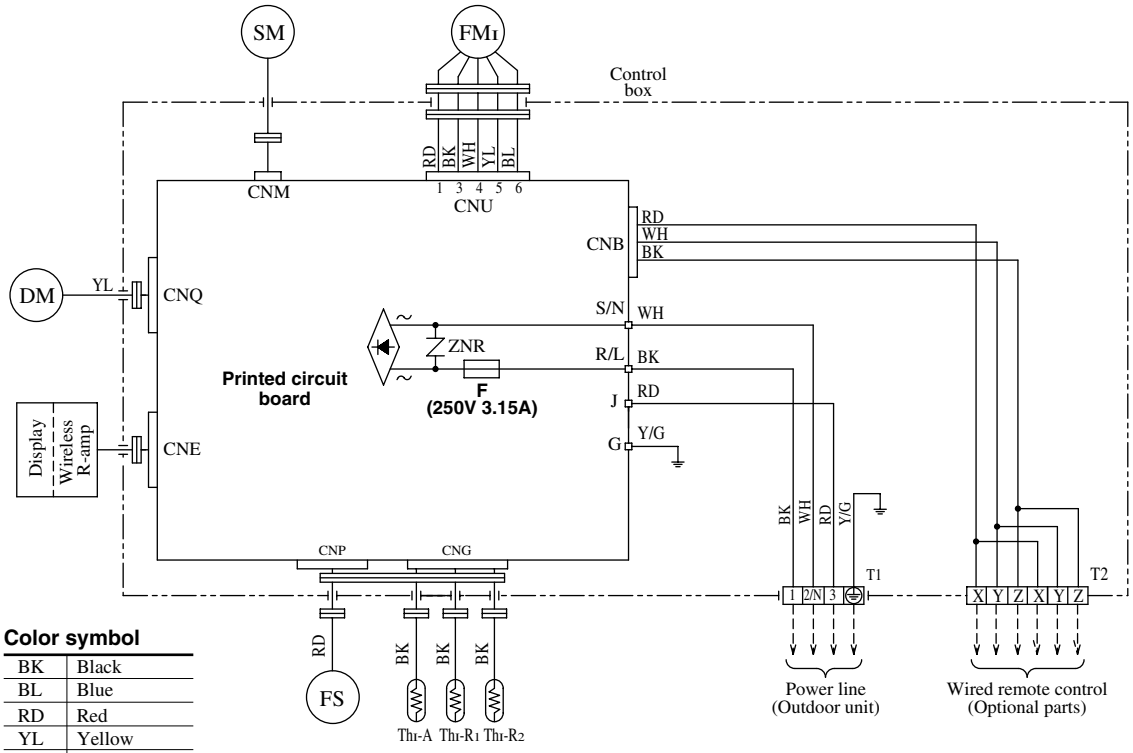
Model SKM50ZF-S



Color symbol

BK	Black
BL	Blue
BR	Brown
RD	Red
WH	White
YL	Yellow
Y/G	Yellow/Green

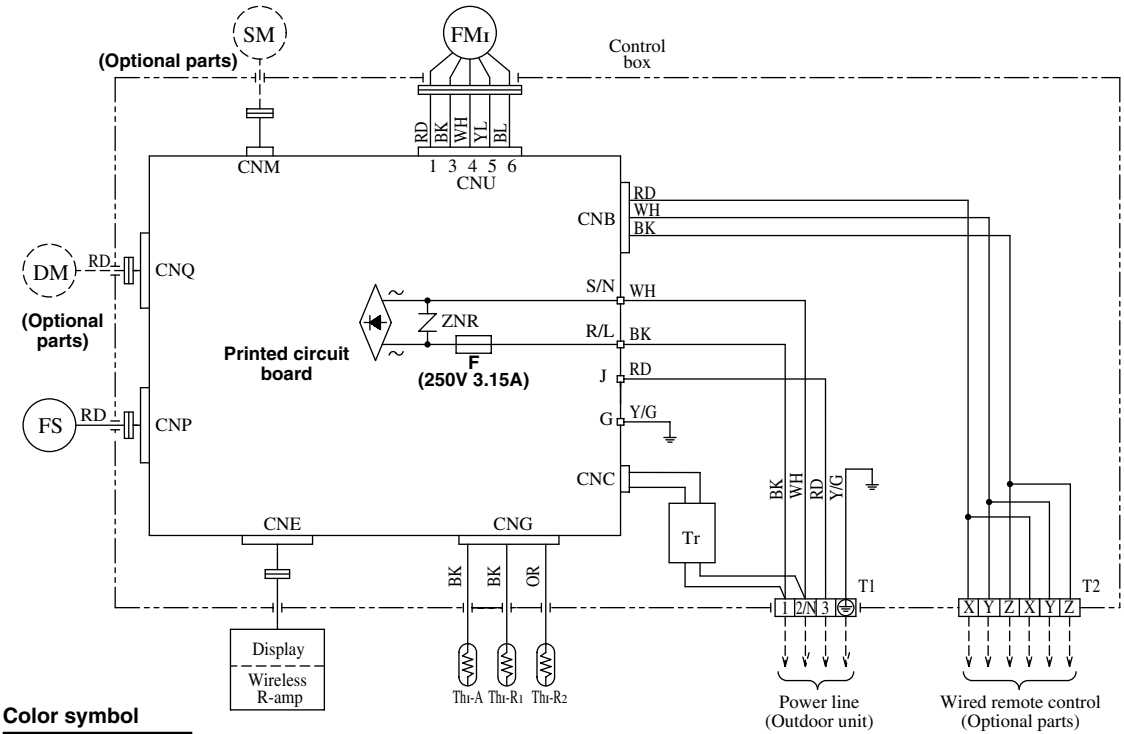
Models STM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S



Color symbol

BK	Black
BL	Blue
RD	Red
YL	Yellow
WH	White
Y/G	Yellow/Green

Models SRRM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S

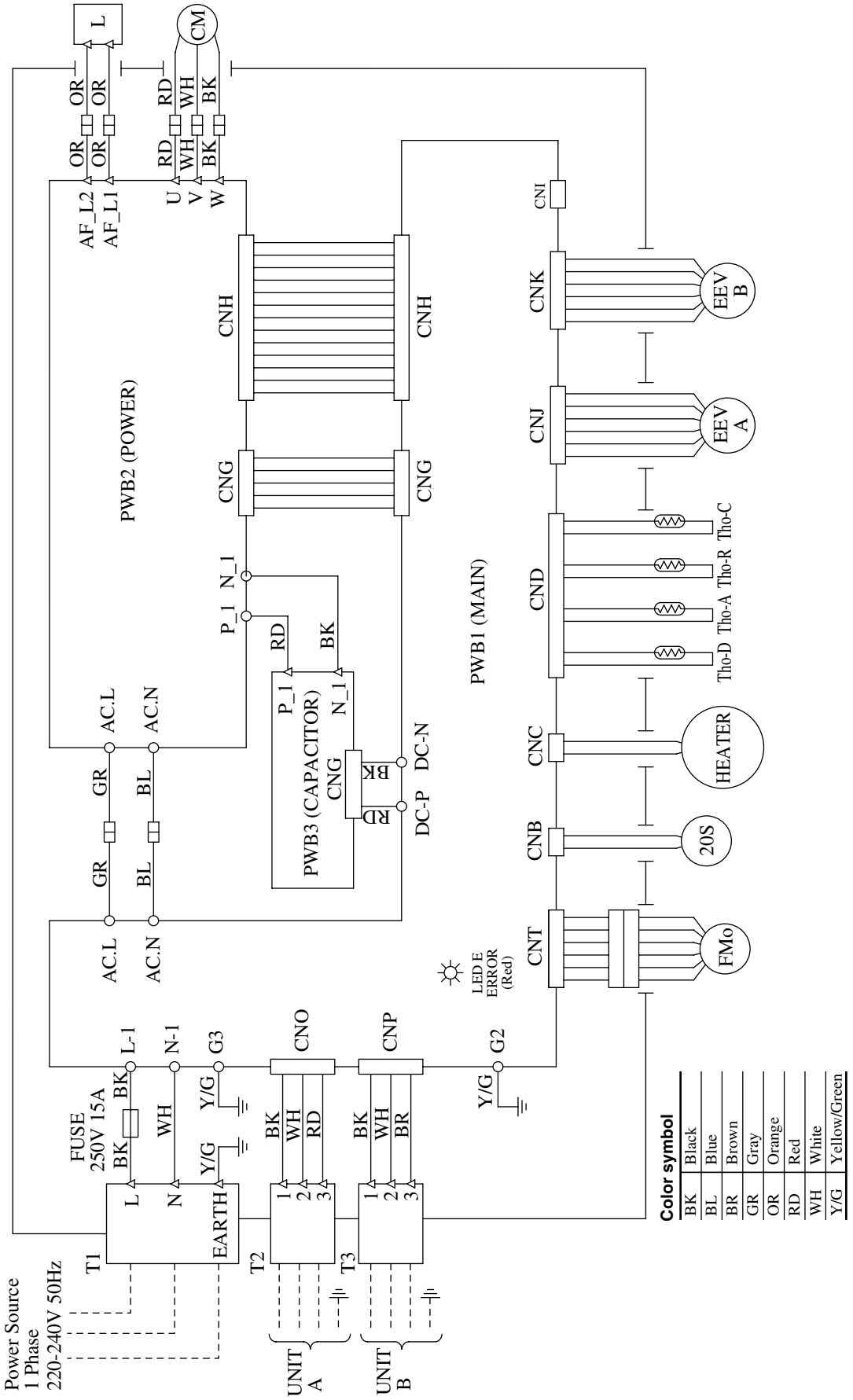


Color symbol

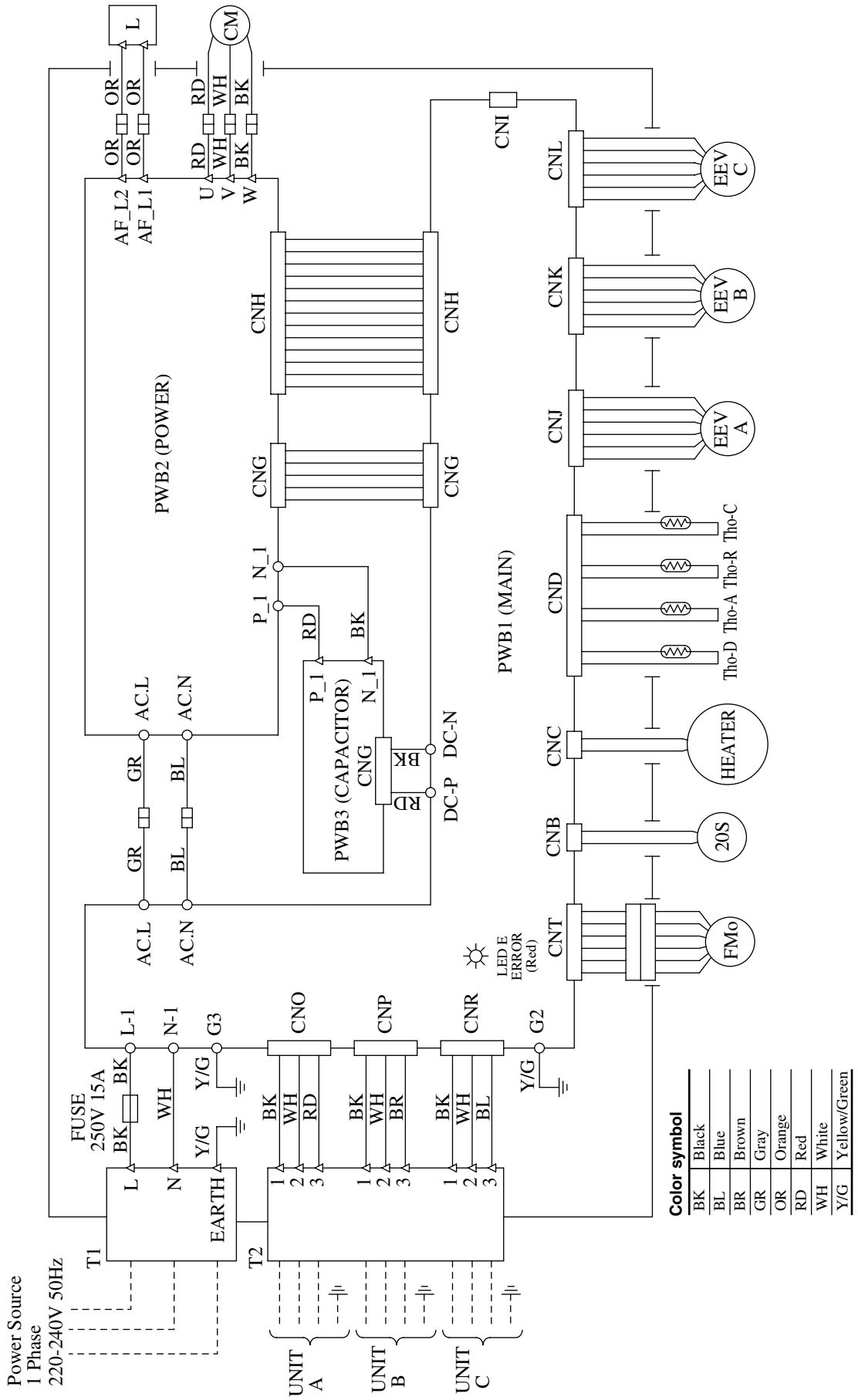
BK	Black
BL	Blue
OR	Orange
RD	Red
YL	Yellow
WH	White
Y/G	Yellow/Green

(2) Outdoor unit

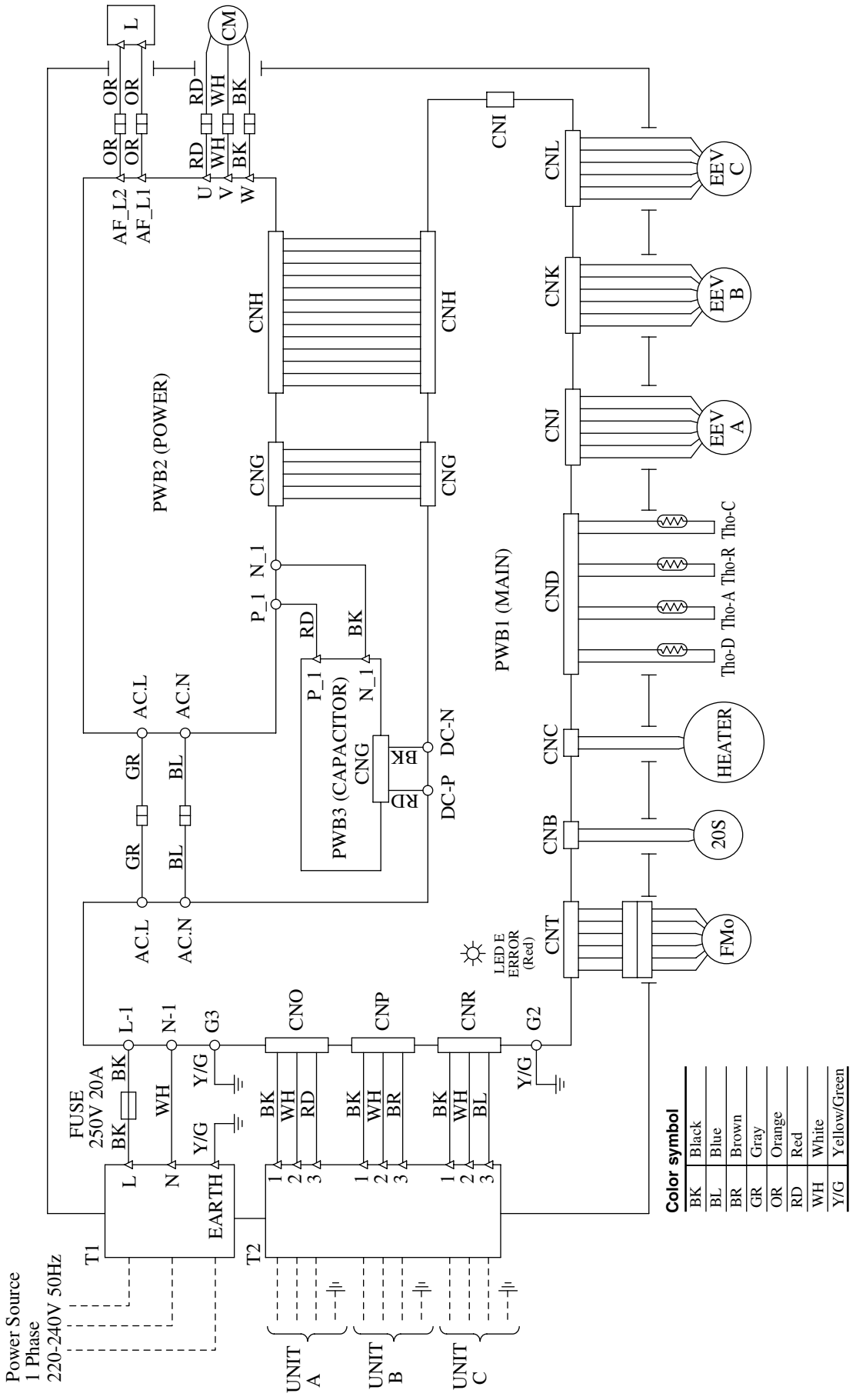
Models SCM40ZF-S, 45ZF-S



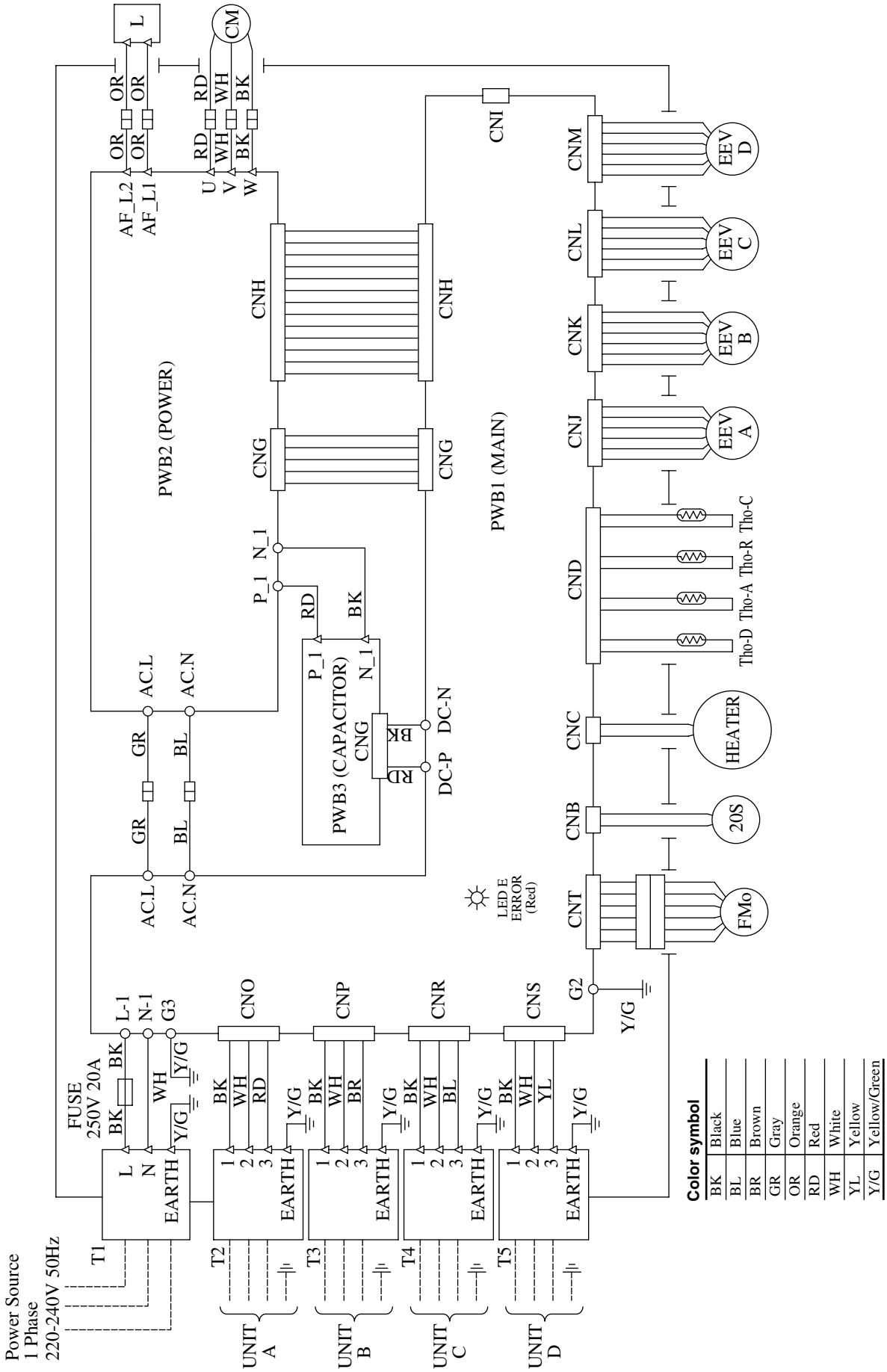
Model SCM48ZF-S



Model SCM60ZF-S



Model SCM80ZF-S



4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

4.1 Operation control function by remote control switch

(1) Wireless remote control

Models All models

◆ Operation section

FAN SPEED button

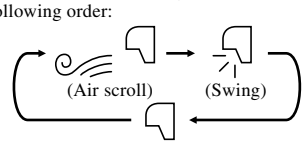
Each time the button is pushed, the ■ indicator is switched over in turn.

HI POWER button

This button changes the HIGH POWER mode.

AIR FLOW button

This button changes the flap mode. When pressed, this button changes the mode in the following order:



(Flap stopped)

This button is not used for SRRM-ZF series. (Air flow direction adjustment can not be performed.)

ON TIMER button

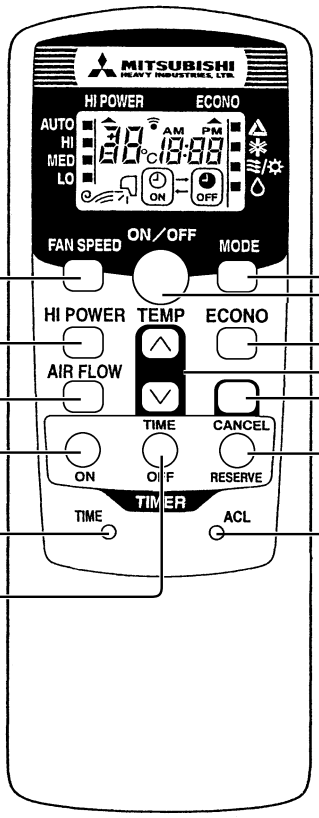
This button selects ON TIMER operation.

TIME switch

This switch for setting the clock.

OFF TIMER button

This button selects OFF TIMER operation.



- The above illustration shows all controls, but in practice only the relevant parts are shown.

OPERATION MODE select button

Each time the button is pushed, the ■ indicator is switched over in turn.

ON/OFF button

Press for starting operation, press again for stopping.

ECONO button

This button changes the ECONOMY mode.

TEMPERATURE button

This button sets the room temperature.

(This button changes the present time and TIMER time.)

CANCEL button

This button cancels the ON timer and OFF timer.

RESERVE button

This button sets the present time and TIMER time.

RESET switch

Switch for resetting microcomputer.

◆ Indication section

HI POWER MODE indicator

Indicates during Hi POWER mode operation.

TEMPERATURE indicator

Indicates set temperature.

(Does not indicate temperature when operation mode is on AUTO)

FAN SPEED indicator

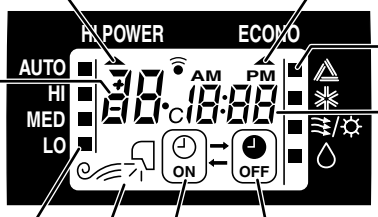
Indicates set air flow rate with ■ lamp.

AIR FLOW indicator

Shows selected flap mode.

ON TIMER indicator

Indicates during ON TIMER operation.



ECONO MODE indicator

Indicates during ECONOMY mode operation.

OPERATION MODE indicator

Indicates selected operation with ■ lamp.

[⧋ (Auto) • ❄ (Cool) • ≋/☼ (Heat) • ♢ (Dry)]

TIME indicator

Indicates present time or timer setting time.

OFF TIMER indicator

Indicates during OFF TIMER operation.

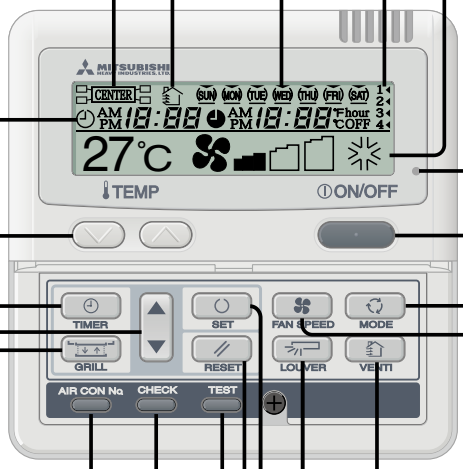
(2) Wired remote control (Optional parts).....STM, SRRM only

The figure below shows the remote control with the cover opened. Note that all the items that may be displayed in the liquid crystal display area are shown in the figure for the sake of explanation.

Characters displayed with dots in the liquid crystal display area are abbreviated.

Note (1) The STM, SRRM models don't support the switches and functions displayed in [ ].

Pull the cover downward to open it.



Central control display
Displayed when the air conditioning system is controlled by the option controller.

Timer operation display
Displays the settings related to timer operation.

Temperature setting switches
These switches are used to set the temperature of the room.

TIMER switch
This switch is used to select a timer mode.
(The comfortable timer cannot be selected.)

Timer setting switches
These switches are used to set the timer mode and time.

[GRILL switch]
This switch has no function.
When this switch is pressed,
INVALID OPER (Invalid Operation)
is displayed, but it does not mean a failure.

AIR CON No. (Air conditioning system No.) switch
Displays the number of the connected air conditioning system.

[CHECK switch]
This switch is used at servicing.

[TEST switch]
This switch is used during test operation.

[Vent Indicator]
Indicates operation in the Ventilation mode.

Weekly timer display
Displays the settings of the weekly timer.

Operation setting display area
Displays setting temperature, airflow volume, operation mode and operation message.

Operation/Check indicator light
During operation: Lit in green
In case of error: Flashing in red

Operation/Stop switch
This switch is used to operate and stop the air conditioning system.
Press the switch once to operate the system and press it once again to stop the system.

MODE switch
This switch is used to switch between operation modes.

FAN SPEED switch
This switch is used to set the airflow volume.
(AUTO, HI POWER or ECONO cannot be selected.)

[VENT switch]
Switch that operates the connected ventilator.

LOUVER switch
This switch is used to operate/stop the swing louver.
This button is not used for SRRM-ZF series.
(Air flow direction adjustment can not be performed.)

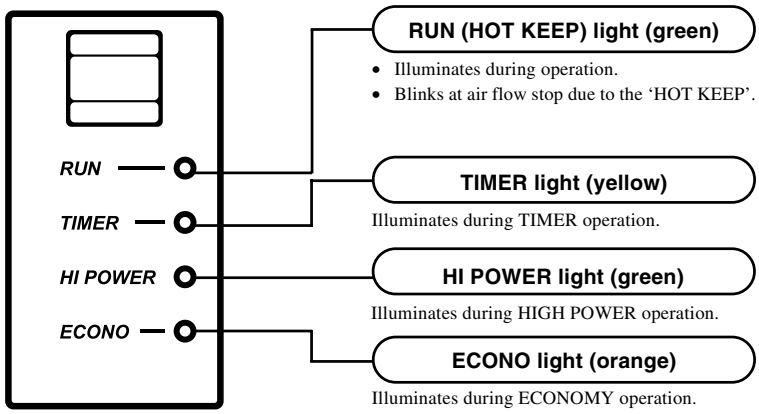
SET switch
This switch is used to apply the timer operation setting.
This switch is also used to make silent mode operation settings.

[RESET switch]
Press this switch while making settings to go back to the previous operation.
This switch is also used to reset the "FILTER CLEANING" message display.
(Press this switch after cleaning the air filter.)

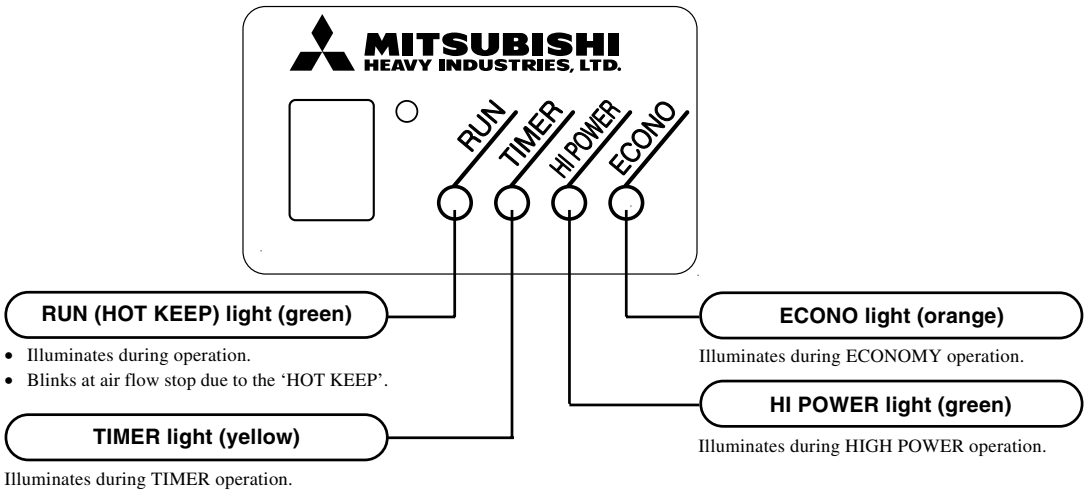
* If you oress any of the switches above and " INVALID OPER" is display, the switch has no function.
But it does not mean a failure.

(3) Unit indication section

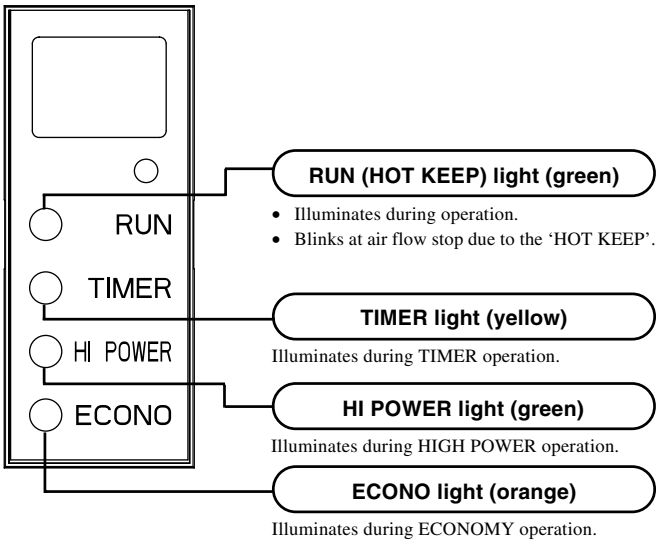
Models SKM20ZF-S, 22ZF-S, 25ZF-S, 28ZF-S, 35ZF-S, 50ZF-S



Models STM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S



Models SRRM25ZF-S, 35ZF-S, 50ZF-S, 60ZF-S



4.2 Unit ON/OFF button

When the remote control batteries become weak, or if the remote control is lost or malfunctioning, this button may be used to turn the unit on and off.

(1) Operation

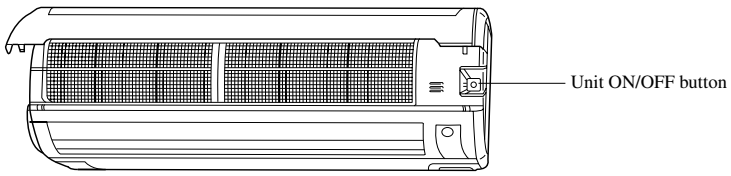
Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

(2) Details of operation

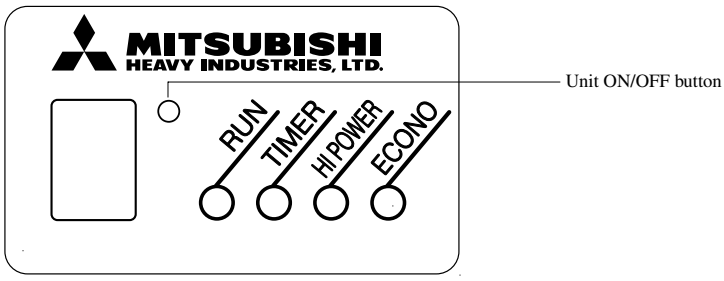
The unit will go into the automatic mode in which it automatically determines, from room temperature (as detected by sensor), whether to go into the cooling, thermal dry or heating modes.

Function / Operation mode	Room temperature setting	Fan speed	Flap (SKM, STM only)	Timer switch
Cooling	About 25°C	Auto	Auto	Continuous
Thermal dry	About 25°C			
Heating	About 26°C			

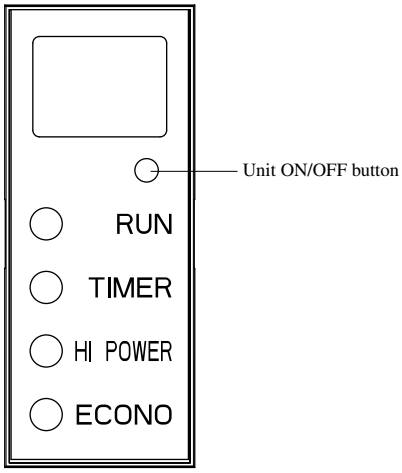
- SKM model



- STM model



- SRRM model



4.3 Drain motor forced operation functions (STM, SRRM only)

(1) Operation

- When the float switch detects drain water, please use the wireless remote control to set the operation mode to "heating", set the temperature to 30°C, and set the timer to continuous operation.
- When the float switch detects drain water, press the TEST switch on wired remote control for 3 seconds.

(2) Detail of operation

Sets the decision speed to 0 rps, stops the indoor fan motor, and only lets the drain motor run for 5 minutes. After this operation finishes, if the float switch detects drain water, it will display an error and stop operation.

(3) Reset condition

(a) When the drain motor has run for 5 minutes.

(b) Use the remote control to set the operation mode to heating, set the temperature to 30°C, and set the timer to something other than continuous operation.

4.4 Power blackout auto restart function

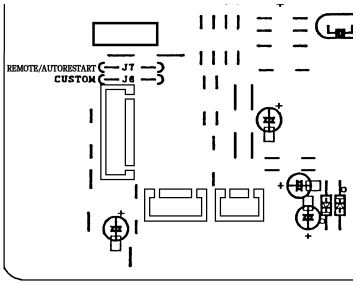
(1) Power blackout auto restart function is that records the operational status of the air-conditioner immediately prior to it being switched off by a power cut, and then automatically resumes operations at that point after the power has been restored.

(2) The following settings will be cancelled:

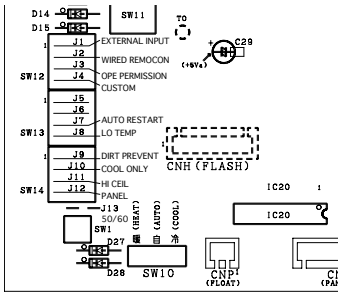
(a) Timer settings

(b) High-power operations

- SKM model



- STM, SRRM model



Notes (1) Power blackout auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.

(2) When power failure ocurrs, the timer setting is cancelled. Once power is resumed, reset the timer.

(3) If the jumper wire (J7) "REMOTE/AUTORESTART(SKM), AUTORESTART (STM, SRRM)" is cut, auto restart is disabled. (See the diagram at above)

4.5 Flap control (SKM, STM only)

Control the flap by AIRFLOW button on the wireless remote control.

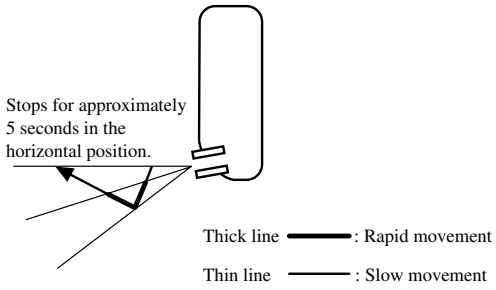
(1) Air scroll

The flap will be automatically set to the angle of air flow best to operation.

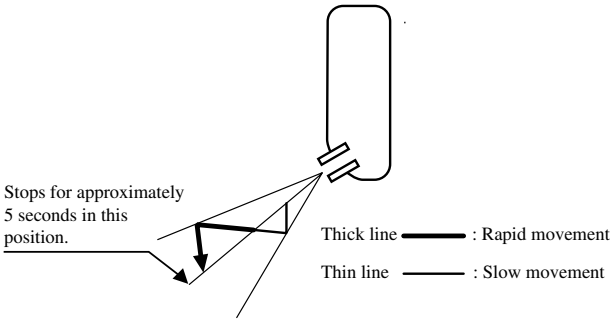
(a) Starting time of operation

- SKM model

During cooling and dry operation

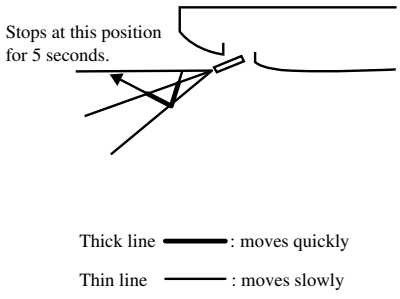


During heating operation

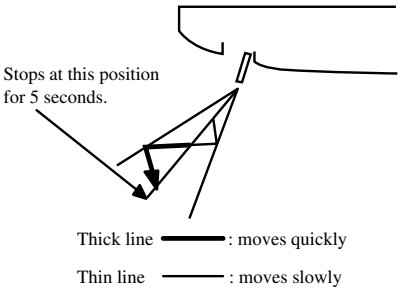


- STM model

During cooling and dry operation



During heating operation



(b) When not operating

The flap closes, when operation has stopped.

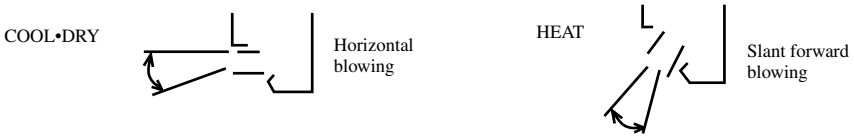
(2) Memory flap

While the flap is operating if the AIRFLOW button is pushed once, it stops swinging at an angle.

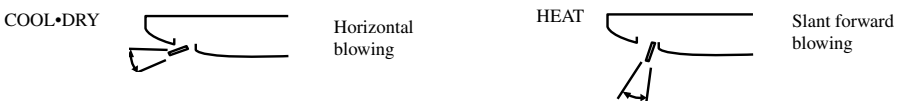
As this angle is memorized in the microcomputer, the flap will be automatically set to the angle when next operation is started.

- Recommendable stopping angle of the flap

- SKM model



- STM model



(3) Swing flap

Flap moves in upward and downward directions continuously.

4.6 Comfortable timer setting

If the timer is set at ON when the operation select switch is set at the cooling or heating, or the cooling or heating in auto mode operation is selected, the comfortable timer starts and determines the starting time of next operation based on the initial value of 15 minutes and the relationship between the room temperature at the setting time (temperature of room temperature sensor) and the setting temperature. (Max. 60 minutes)

4.7 Cooling operation

(1) Summary

(a) Capacity control

Model	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
Capacity	1.9 ~ 4.9 kW	0.7 ~ 5.6 kW	1.1 ~ 6.7 kW	1.4 ~ 6.9 kW	1.0 ~ 9.3 kW

Capacity control is within the range shown above. If demand capacity of the indoor units exceeds the maximum capacity of the outdoor unit, the demand capacity will be proportionally distributed.

(b) Outdoor unit speed control

Indoor unit command total speed value	Decision speed
0 rps	0 rps
A rps or less	A rps
More than A rps, but B rps or less	A rps to B rps
More than B rps	B rps

- Values of A, B

Model	40	45	48	60	80
A	35	10	10	10	10
B	85	126	120	95	95

Note (1) The indoor unit command total speed value is the total of the values from each unit in item (2).

(2) Mode switching

Within the selected mode, the unit operates using the values shown below which were obtained by multiplying a conversion coefficient to the indoor unit command speed.

(a) SCM40ZF-S, 45ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35
Automatic	12 ~ 43	12 ~ 45	12 ~ 46	12 ~ 55	12 ~ 66
High	12 ~ 43	12 ~ 45	12 ~ 46	12 ~ 55	12 ~ 66
Medium	12 ~ 34	12 ~ 36	12 ~ 39	12 ~ 42	12 ~ 43
Low	12 ~ 24	12 ~ 24	12 ~ 25	12 ~ 27	12 ~ 28
Hi power	43	45	46	48	52
Econo	12 ~ 34	12 ~ 36	12 ~ 39	12 ~ 42	12 ~ 43

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35
Automatic	12 ~ 54	12 ~ 99 (12~ 90)
High	12 ~ 54	12 ~ 99 (12~ 90)
Medium	12 ~ 40	12 ~ 70
Low	12 ~ 27	12 ~ 42
Hi power	54	90
Econo	12 ~ 40	12 ~ 70

Note (1) Values in ( ) are for type SRRM.

(b) SCM48ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35
Automatic	12 ~ 43	12 ~ 45	13 ~ 52	13 ~ 61	15 ~ 82
High	12 ~ 43	12 ~ 45	13 ~ 52	13 ~ 61	15 ~ 82
Medium	12 ~ 34	12 ~ 36	13 ~ 43	13 ~ 46	15 ~ 54
Low	12 ~ 24	12 ~ 24	13 ~ 28	13 ~ 29	15 ~ 35
Hi power	43	45	52	53	65
Econo	12 ~ 34	12 ~ 36	13 ~ 43	13 ~ 46	15 ~ 54

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35
Automatic	12 ~ 54	12 ~ 99 (12~ 90)
High	12 ~ 54	12 ~ 99 (12~ 90)
Medium	12 ~ 40	12 ~ 70
Low	12 ~ 27	12 ~ 42
Hi power	54	90
Econo	12 ~ 40	12 ~ 70

Note (1) Values in ( ) are for type SRRM.

(c) SCM60ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35	50
Automatic	7 ~ 27	7 ~ 28	7 ~ 29	7 ~ 34	7 ~ 41	9 ~ 61
High	7 ~ 27	7 ~ 28	7 ~ 29	7 ~ 34	7 ~ 41	9 ~ 61
Medium	7 ~ 21	7 ~ 22	7 ~ 24	7 ~ 26	7 ~ 27	9 ~ 32
Low	7 ~ 15	7 ~ 15	7 ~ 15	7 ~ 16	7 ~ 17	9 ~ 18
Hi power	27	28	29	30	32	51
Econo	7 ~ 21	7 ~ 22	7 ~ 24	7 ~ 26	7 ~ 27	9 ~ 32

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35	50	60
Automatic	5 ~ 25	5 ~ 46 (5~ 42)	7 ~ 59	7 ~ 64
High	5 ~ 25	5 ~ 46 (5~ 42)	7 ~ 59	7 ~ 64
Medium	5 ~ 18	5 ~ 32	7 ~ 42	7 ~ 47
Low	5 ~ 12	5 ~ 19	7 ~ 24	7 ~ 27
Hi power	25	42	59	64
Econo	5 ~ 18	5 ~ 32	7 ~ 42	7 ~ 47

Note (1) Values in ( ) are for type SRRM.

(d) SCM80ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35	50
Automatic	7 ~ 27	7 ~ 28	7 ~ 29	7 ~ 34	7 ~ 41	9 ~ 61
High	7 ~ 27	7 ~ 28	7 ~ 29	7 ~ 34	7 ~ 41	9 ~ 61
Medium	7 ~ 21	7 ~ 22	7 ~ 24	7 ~ 26	7 ~ 27	9 ~ 32
Low	7 ~ 15	7 ~ 15	7 ~ 15	7 ~ 16	7 ~ 17	9 ~ 18
Hi power	27	28	29	30	32	51
Econo	7 ~ 21	7 ~ 22	7 ~ 24	7 ~ 26	7 ~ 27	9 ~ 32

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35	50	60
Automatic	7 ~ 33	7 ~ 62 (7~ 56)	9 ~ 79	9 ~ 85
High	7 ~ 33	7 ~ 62 (7 ~ 56)	9 ~ 79	9~ 85
Medium	7 ~ 25	7 ~ 44	9 ~ 56	9 ~ 63
Low	7 ~ 16	7 ~ 26	9 ~ 32	9 ~ 36
Hi power	33	56	79	85
Econo	7 ~ 25	7 ~ 44	9 ~ 56	9 ~ 63

Note (1) Values in ( ) are for type SRRM.

(3) Operation of major functional components in cooling mode

Functional components \ Operation		Cooling	Thermostat OFF (All indoor units)	Thermostat OFF (Some of indoor units)	Fan, stop, abnormal stop (Some of indoor units)	Failure (Outdoor unit)
Command speed		See preceding table	0 (All indoor units)	0 (Thermostat off units)	0 (Fan, stop, abnormal stop units)	0 (All units)
Indoor unit fan	Fixed	According to mode switching				
	Automatic	According to command speed	According to mode switching	According to command speed		
Outdoor unit fan		According to outdoor unit speed	OFF	According to outdoor unit speed		OFF
Electronic expansion valve		According to decision speed	According to stop mode	All closed (Thermostat off units)	All closed (Fan, stop, abnormal stop units)	According to stop mode
Compressor		ON	OFF	ON	ON	OFF

4.8 Heating operation

(1) Summary

(a) Capacity control

Model	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
Capacity	1.3 ~ 5.2 kW	0.7 ~ 6.8 kW	0.78 ~ 7.1 kW	0.75 ~ 7.2 kW	0.95 ~ 9.5 kW

Capacity control is within the range shown above. If demand capacity of the indoor units exceeds the maximum capacity of the outdoor unit, the demand capacity will be proportionally distributed.

(b) Outdoor unit speed control

Indoor unit command total speed value	Decision speed
0 rps	0 rps
A rps or less	A rps
More than A rps, but B rps or less	A rps to B rps
More than B rps	B rps

● Values of A, B

Model	40	45	48	60	80
A	35	10	10	10	10
B	90	126	120	95	95

Note (1) The indoor unit command total speed value is the total of the values from each unit in item (2).

(2) Mode switching

Within the selected mode, the unit operates using the values shown below which were obtained by multiplying a conversion coefficient to the indoor unit command speed.

(a) SCM40ZF-S, 45ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35
Automatic	12 ~ 73	12 ~ 75	12 ~ 76	12 ~ 78	12 ~ 85
High	12 ~ 73	12 ~ 75	12 ~ 76	12 ~ 78	12 ~ 85
Medium	12 ~ 51	12 ~ 52	12 ~ 54	12 ~ 55	12 ~ 57
Low	12 ~ 30	12 ~ 30	12 ~ 31	12 ~ 33	12 ~ 34
Hi power	73	75	76	78	82
Econo	12 ~ 51	12 ~ 52	12 ~ 54	12 ~ 55	12 ~ 57

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35
Automatic	12 ~ 87	12 ~ 105
High	12 ~ 87	12 ~ 105
Medium	12 ~ 63	12 ~ 78
Low	12 ~ 37	12 ~ 45
Hi power	87	105
Econo	12 ~ 63	12 ~ 78

(b) SCM48ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35
Automatic	12 ~ 73	12 ~ 75	13 ~ 85	13 ~ 86	15 ~ 107
High	12 ~ 73	12 ~ 75	13 ~ 85	13 ~ 86	15 ~ 107
Medium	12 ~ 51	12 ~ 52	13 ~ 60	13 ~ 61	15 ~ 71
Low	12 ~ 30	12 ~ 30	13 ~ 35	13 ~ 36	15 ~ 43
Hi power	73	75	85	86	103
Econo	12 ~ 51	12 ~ 52	13 ~ 60	13 ~ 61	15 ~ 71

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35
Automatic	12 ~ 87	12 ~ 105
High	12 ~ 87	12 ~ 105
Medium	12 ~ 63	12 ~ 78
Low	12 ~ 37	12 ~ 45
Hi power	87	105
Econo	12 ~ 63	12 ~ 78

(c) SCM60ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35	50
Automatic	7 ~ 46	7 ~ 47	7 ~ 47	7 ~ 48	7 ~ 53	9 ~ 85
High	7 ~ 46	7 ~ 47	7 ~ 47	7 ~ 48	7 ~ 53	9 ~ 85
Medium	7 ~ 31	7 ~ 32	7 ~ 33	7 ~ 34	7 ~ 35	9 ~ 37
Low	7 ~ 18	7 ~ 18	7 ~ 19	7 ~ 20	7 ~ 21	9 ~ 23
Hi power	46	47	47	48	51	73
Econo	7 ~ 31	7 ~ 32	7 ~ 33	7 ~ 34	7 ~ 35	9 ~ 37

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35	50	60
Automatic	5 ~ 40	5 ~ 49	7 ~ 59	7 ~ 64
High	5 ~ 40	5 ~ 49	7 ~ 59	7 ~ 64
Medium	5 ~ 29	5 ~ 36	7 ~ 42	7 ~ 47
Low	5 ~ 17	5 ~ 21	7 ~ 24	7 ~ 27
Hi power	40	49	59	64
Econo	5 ~ 29	5 ~ 36	7 ~ 42	7 ~ 47

(d) SCM80ZF-S

◆SKM model

(rps)

Model (Indoor) / Operation Mode	20	22	25	28	35	50
Automatic	7 ~ 46	7 ~ 47	7 ~ 47	7 ~ 48	7 ~ 53	9 ~ 85
High	7 ~ 46	7 ~ 47	7 ~ 47	7 ~ 48	7 ~ 53	9 ~ 85
Medium	7 ~ 31	7 ~ 32	7 ~ 33	7 ~ 34	7 ~ 35	9 ~ 37
Low	7 ~ 18	7 ~ 18	7 ~ 19	7 ~ 20	7 ~ 21	9 ~ 23
Hi power	46	47	47	48	51	73
Econo	7 ~ 31	7 ~ 32	7 ~ 33	7 ~ 34	7 ~ 35	9 ~ 37

◆STM, SRRM models

(rps)

Model (Indoor) / Operation Mode	25	35	50	60
Automatic	7 ~ 54	7 ~ 65	9 ~ 79	9 ~ 85
High	7 ~ 54	7 ~ 65	9 ~ 79	9~ 85
Medium	7 ~ 39	7 ~ 48	9 ~ 56	9 ~ 63
Low	7 ~ 23	7 ~ 28	9 ~ 32	9 ~ 36
Hi power	54	65	79	85
Econo	7 ~ 39	7 ~ 48	9 ~ 56	9 ~ 63

(3) Operation of major functional components in heating mode

Functional components \ Operation		Cooling	Thermostat OFF (All indoor units)	Thermostat OFF (Some of indoor units)	Fan, stop, abnormal stop (Some of indoor units)	Failure (Outdoor unit)
Command speed		See preceding table	0 (All indoor units)	0 (Thermostat off units)	0 (Fan, stop, abnormal stop units)	0 (All units)
Indoor unit fan	Fixed	According to mode switching	Hot Keep	According to mode switching		Hot Keep
	Automatic	According to command speed	Hot Keep	According to command speed		Hot Keep
Outdoor unit fan		According to outdoor unit speed	OFF	According to outdoor unit speed		OFF
Electronic expansion valve		According to decision speed	According to stop mode	According to heating stop unit control (Thermostat off units)	According to heating stop unit control (Fan, stop, abnormal stop units)	According to stop mode
Compressor		ON	OFF	ON	ON	OFF

(4) Hot keep operation

If the hot keep operation is selected during the heating operation, the indoor fan is controlled based on the temperature of the indoor unit heat exchanger (detected with THI-R1)

(5) Defrosting

(a) When the following conditions are met, the defrosting operation will start.

1) During normal operation

a) When 40 minutes has passed since the start of heating or 40 minutes after the last defrosting (based on cumulative operation time of compressor).

b) When the outdoor heat exchanger sensor (Tho-R) temperature is –2 °C or less for 3 continuous minutes after 37 minutes have passed.

c) Outdoor temperature sensor (Tho-A) – outdoor heat exchanger sensor (Tho-R) temperature ≧ 0.44 × outdoor temperature sensor (Tho-A) temperature + A °C or more.

A = Outdoor temperature ≧ – 2 °C: 4, outdoor temperature < – 2 °C: 6.

d) When the compressor is operating.

▷ Or, during heating, defrosting will start when the decision speed counts zero (0) rps for 10 times or more and all conditions in a), b) and d) above and when the outdoor air temperature is 3°C or less have been satisfied.

2) During defrosting acceleration

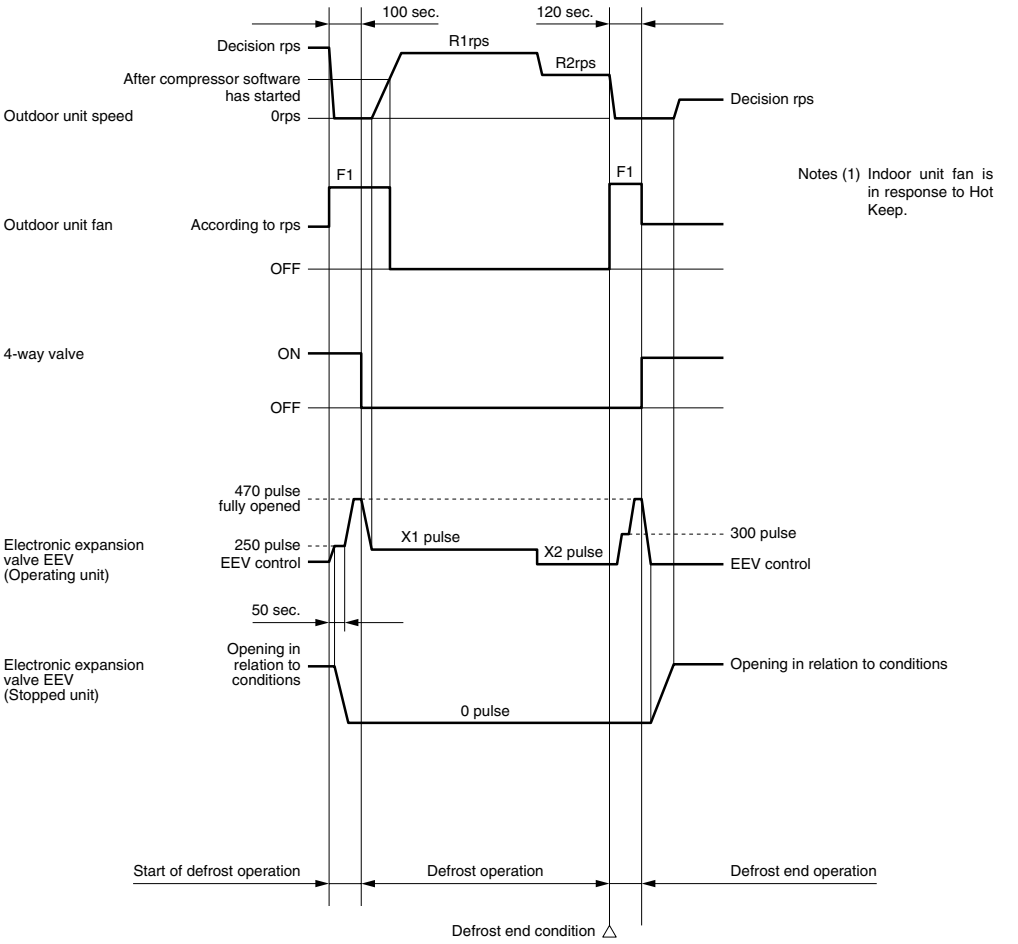
a) When 40 minutes has passed since the last defrosting (based on cumulative operation time of compressor).

b) When the compressor is operating.

▷ Or, during heating, defrosting will start when the decision speed counts zero (0) rps for 10 times or more and all conditions in a) and b) have been satisfied.

Note (1) Defrosting acceleration is when the finishing of the previous defrosting is according to the defrosting conditions of the 10 minutes that have passed.

3) Operation of function component in defrosting



◆SCM40ZF-S

Outdoor unit speed				Outdoor unit fan
R1 (rps)		R2 (rps)		F1
1-room	2-room	1-room	2-room	6th speed
70	70	50	50	

	X1 pluse		X2 pluse	
	1-room	2-room	1-room	2-room
Operating unit	180	135	140	105

◆SCM45ZF-S

Outdoor unit speed				Outdoor unit fan
R1 (rps)		R2 (rps)		F1
1-room	2-room	1-room	2-room	6th speed
70	70	50	50	

	X1 pluse		X2 pluse	
	1-room	2-room	1-room	2-room
Operating unit	135	180	105	140

◆SCM48ZF-S

Outdoor unit speed						Outdoor unit fan
R1 (rps)			R2 (rps)			F1
1-room	2-room	3-room	1-room	2-room	3-room	6th speed
45	75	110	35	55	75	

	X1 pluse			X2 pluse		
	1-room	2-room	3-room	1-room	2-room	3-room
Operating unit	180	160	150	140	115	110

◆SCM60ZF-S

Outdoor unit speed						Outdoor unit fan
R1 (rps)			R2 (rps)			F1
1-room	2-room	3-room	1-room	2-room	3-room	6th speed
20	35	50	15	25	35	

	X1 pluse			X2 pluse		
	1-room	2-room	3-room	1-room	2-room	3-room
Operating unit	180	160	150	140	115	110

◆SCM80ZF-S

Outdoor unit speed								Outdoor unit fan
R1 (rps)				R2 (rps)				F1
1-room	2-room	3-room	4-room	1-room	2-room	3-room	4-room	6th speed
30	35	50	65	20	25	35	45	

	X1 pluse				X2 pluse			
	1-room	2-room	3-room	4-room	1-room	2-room	3-room	4-room
Operating unit	99	94	91	90	89	82	81	80

4) Conditions for finishing defrosting

When any of the following conditions is met, the defrosting finishing operation will start.

① When the temperature of the outdoor heat exchanger sensor (Tho-R) is 20 °C or more.

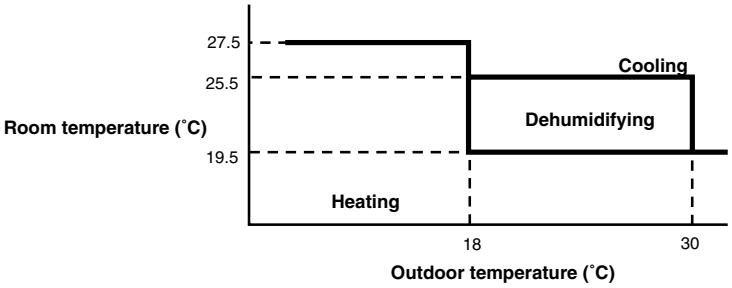
② When 10 minutes has passed after the start of defrosting.

③ When the temperature at the outdoor heat exchanger sensor (Tho-R) is 18°C or higher continuously for 1 minute. (40, 48, 80 type)

4.9 Outline of automatic operation

(1) Determination of operation mode

The unit checks the room temperature and the outdoor air temperature after operating the indoor and outdoor blowers for 20 seconds, determines the operation mode and the room temperature setting correction value, and then enters in the automatic operation.



(2) The unit checks the temperature every hour after the start of operation and, if the result of check is not same as the previous operation mode, changes the operation mode.

(3) When the unit is started again within one hour after the stop of automatic operation or when the automatic operation is selected during heating, cooling or dehumidifying operation, the unit is operated in the previous operation mode.

(4) Setting temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote control and the setting temperature.

		Signals of wireless remote control (Display)												
		–6	–5	–4	–3	–2	–1	±0	+1	+2	+3	+4	+5	+6
Setting temperature	Cooling	19	20	21	22	23	24	25	26	27	28	29	30	31
	Dehumidifying	19	20	21	22	23	24	25	26	27	28	29	30	31
	Heating	20	21	22	23	24	25	26	27	28	29	30	31	32

4.10 Determining the operating mode

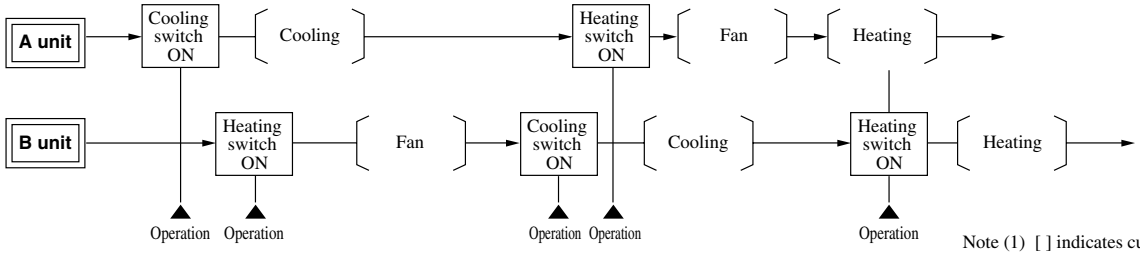
The cooling and heating operating modes are the remote control switch mode that have been previously determined.

If a mode differing from these is selected after this, the selected mode will appear in the display of the remote control, but only the fan will operate.

Example	First operation			Second operation			Notes
	Selected Mode	Remote Control Display	Operation	Selected Mode	Remote Control Display	Operation	
1	**Cooling**	**Cooling**	**Cooling**	**Heating**	**Heating**	**Fan (1)**	**• Different mode is only fan operation.**
2	**Heating**	**Heating**	**Heating**	**Cooling**	**Cooling**	**Fan**	

Note (1) If the display shows heating and the operation is fan, Hot Keep will operate.

Example of operating pattern



Note (1) [ ] indicates currect operation.

4.11 External control (remote display) /control of input signal (STM, SRRM only)

Make sure to connect the wired remote control unit. Control of input signal is not available without the wired remote control unit.

(1) External control (remote display) output

Following output connectors (CNT) are provided on the printed circuit board of indoor unit.

(a) Operation output: Power to engage DC 12V relay (provided by the customer) is outputted during operation.

(b) Heating output: Power to engage DC 12V relay (provided by the customer) is outputted during the heating operation.

(c) Compressor ON output: Power to engage DC 12V relay (provided by the customer) is outputted while the compres sor is operating.

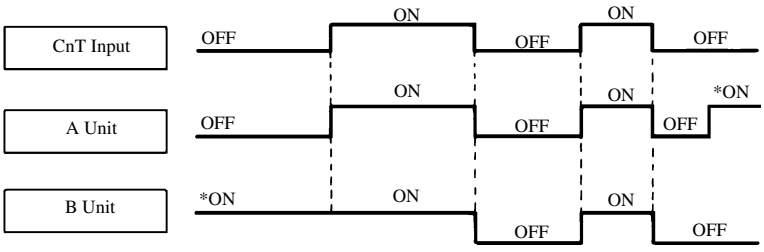
(d) Error output: When any error occurs, the power to engage DC 12V relay (provided by the customer) is outputted.

(2) Control of input signal

Control of input signal (switch input, timer input) connectors (CNT) are provided on the control circuit board of the indoor unit. However, when the operation of air conditioner is under the Center Mode, the remote control by CnT is invalid.

(a) If the factory settings (Jumper wire J1 EXTERNAL INPUT on the PCB) are set, or "LEVEL INPUT" is selected in the wired remote control's indoor unit settings.

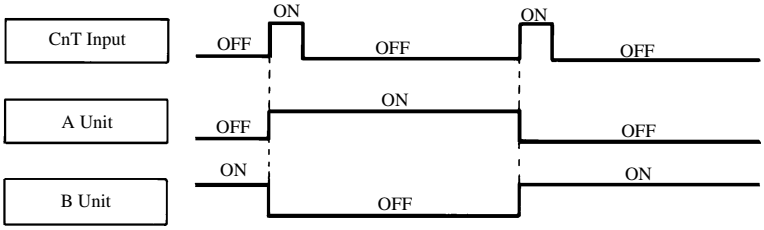
1) Input signal to CnT OFF → ON – – – – Air conditioner ON
2) Input signal to CnT ON → OFF – – – – Air conditioner OFF



Note (1) The ON with the * mark indicates an ON operation using the remote control unit switch, etc.

(b) When Jumper wire J1 on the PCB of indoor unit is cut at the field or "PULSE INPUT" is selected in the wired remote control's indoor unit settings.

Input signal to CnT becomes valid at OFF → ON only and the motion of air conditioner [ON/OFF] is inverted.



4.12 Operation permission/prohibition control (STM, SRRM only)

The air conditioner operation is controlled by releasing the jumper wire (J3) on the indoor control board and inputting the external signal into the CnT.

(1) The operation mode is switched over between Permission and Prohibition by releasing the jumper wire (J3) on the indoor control board.

When the jumper wire (J3) is short circuited	When the jumper wire (J3) is released
Normal operation is enable (when shipping) When CnT input is set to ON, the operation starts and if the input is set to OFF, the operation stops. For the CnT and remote control inputs, the input which is activated later has priority and can start and stop the operation.	Permission / Prohibition mode When Cnt input is set to ON, the operation mode is changed to permission and if input is set to OFF the operation is prohibited.

(2) When the CnT input is set to ON (Operation permission)

(a) The air conditioner can be operated or stopped by the signal from the remote control signal line.
(When the "CENTER" mode is set, the operation can be controlled only by the center input).

(b) When the CnT input is changed from OFF to ON, the air conditioner operation mode is changed depending on the status of the jumper wire (J1) on the indoor control board.

When the jumper wire (J1) is short circuited	When the jumper wire (J1) is released
The signal (a) above starts the air conditioner. (Shipping status)	When the CnT input is set to ON, the air conditioner starts operation. After that, the operation of the air conditioner depends on (a) above. (Local status)

(3) When the CnT input is set to OFF (Prohibition)

(a) The air conditioner cannot be operated or stopped by the signal from the remote control signal line.

(b) The air conditioner operation is stopped when the CnT input is changed from ON to OFF.

(4) When the operation permission / prohibition mode is set to effective by the indoor function setting selected by the remote control, the operation depends on (1) above.

4.13 Control and protection functions

(1) Frost prevention for indoor heat exchanger (During cooling or dehumidifying)

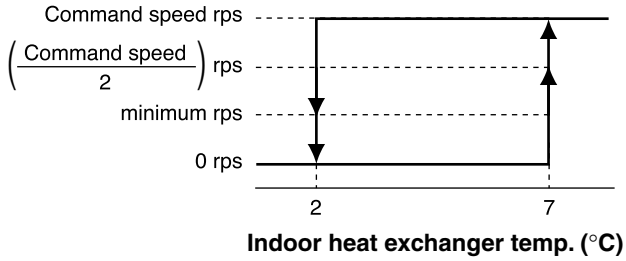
♦ **<I>**

(a) Operating condition

After the indoor command speed is other than 0 rps for 9 minutes, when the indoor heat exchanger (ThI-R1) is 2°C or lower for 1minute continuously.

(b) Detail of operation

1) The indoor command speed is minimum rps for 5 minutes.
2) After 1) above, if the indoor heat exchanger is 2°C or lower, the speed is 0 rps.
3) After 1) above, if the indoor heat exchanger is more than 2°C, it returns normal operation.
4) After 2) above, if the indoor heat exchanger is 7°C or higher, it runs for 5 minutes at half of indoor command speed, then it returns normal operation.



♦ **<II>**

(a) Operating conditions (When all the conditions below are satisfied)

① After the indoor command speed is other then 0 rps for 8 minutes, when the indoor heat exchanger (ThI-R1) is 5°C or lower.

② The indoor command speed is more than minimum rps.

(b) Detail of operation

1) When indoor heat exchanger is 5°C or lower, the indoor command speed is reduced by 4 rps at each 20 seconds. The lower limit speed is minimum rps.
2) When the indoor heat exchanger is in the range of 5~7°C, if the command speed is been maintained and the operation has continued for more than 20 seconds at same speed, it returns to the normal operation.

(c) Reset condition: When the indoor heat exchanger (ThI-R1) is 7°C or higher.

(2) Drain water overflow prevention function (STM, SRRM type only)

(a) Operation condition: Float switch detects drain water for more than 3 seconds.

(b) Detail of operation: Sets the indoor command speed to 0 rps, stops the indoor fan motor, and only lets the drain motor run for 5 minutes. After this operation finishes, if the float switch detects drain water, it will display an error and stop operation.

(c) Rest conditions: After the drain motor run for 5 minutes, the float switch cannot detect water.

(3) Dew condensation prevention control for the cooling and dehumidifying operation (STM, SRRM type only)

♦ <I>

(a) Operation condition: During cooling or dehumidifying operation, 20 minutes elapsed after starting (with indoor command speed something other than 0 rps), under the following conditions.

1) When the fan speed is set to "AUTO" or "HI", or operation mode is set to "HI POWER"

(b) Detail of operation: The upper limit of the indoor command speed is set to the maximum number of revolutions at fan speed "MED".

(c) Rest conditions: Any one of the following conditions.

1) Fan speed set to anything other than "AUTO" or "HI", or operation mode set to something other than "HI POWER"
2) 50 minutes elapsed after starting (with indoor command speed something other than 0 rps)
3) When indoor command speed is set to 0 rps

♦ <II>

(a) Operation condition: During cooling or dehumidifying operation after starting (with indoor command speed set to something other than 0 rps), and all of the following conditions are satisfied.

1) When fan speed set to "AUTO" or "HI", or operation mode to "HI POWER".
2) When the indoor heat exchanger temp.(ThI-R1) rises 5˚C or more relative to the lowest temperature within the first 3 minutes of operation.

(b) Detail of operation: The upper limit of the indoor command speed is set to the maximum number of revolutions at fan speed "MED".

(c) Rest conditions: Any one of the following conditions.

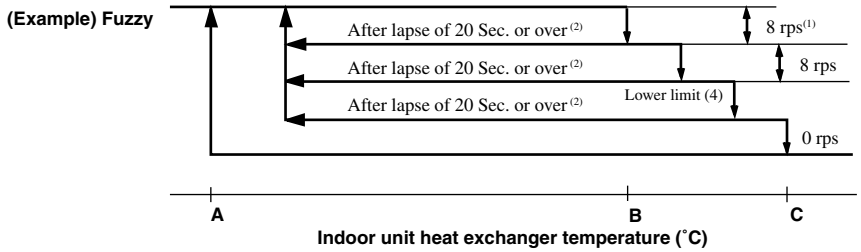
1) Fan speed set to anything other than "AUTO" or "HI", or operation mode set to anything other than "HI POWER"
2) 30 minutes elapsed after this command starts
3) Indoor command speed set to 0 rps

(4) High pressure control

(a) Purpose: Prevents abnormally high pressure operation during heating.

(b) Detector: Indoor unit heat exchanger sensor (ThI-R1)

(c) Detail of operation:



Notes (1) When the indoor unit heat exchanger temperature is in the range of B~C °C, the indoor command speed is reduced by 8 rps at each 20 seconds. When the temperature is C °C or over for 1 minute continuously, the compressor is stopped.
(2) When the indoor unit heat exchanger temperature is in the range of A~B °C, if the indoor command speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal heating operation.
(3) Indoor blower retains the fan tap when it enters in the high pressure control. Outdoor blower is operated in accordance with the speed.
(4) 22~35 type: 20 rps. 50~60 type: 35 rps

● **Temperature list** Unit : °C

	A	B	C
ThI-A ≦ 24	48.5	56	62
24 < ThI-A ≦ 27	47.5	53	61
27 < ThI-A	46.5	50	60

(5) Freezing cycle system protective control

(a) Operating conditions: When both of following conditions have continued for more than 5 minutes later than 5 minutes after the start of operation.

1) Indoor command speed is higher than 0 rps
2) During cooling, dehumidifying: Indoor heat exchanger temperature - Room temperature > −4°C

(b) Detail of operation

1) Indoor unit

   The command speed is forced to operate at 16 rps.

2) Outdoor unit

   For 5 minutes after the main controller starts, the outdoor unit speed is 12 (10) rps. After 5 minutes, the outdoor unit speed is 64 (30) rps, up until 8 minutes of operation. After 8 minutes, the outdoor unit speed is 12 (10) rps, up until 13 minutes of operation. After 13 minutes, the outdoor unit speed is 64 (30) rps, up until 16 minutes of operation.

(c) Restoration conditions: When the condition becomes either conditions shown below

During cooling, dehumidifying: $Th_I\text{-}R_1$ (8) – $Th_I\text{-}R_1$(5) ≦ −2°C, $Th_I\text{-}R_1$ (16) – $Th_I\text{-}R_1$(13) ≦ −2°C

Notes (1) $Th_I\text{-}R_1$(X): After this control starts, the indoor heat exchanger temperature after X minutes.
(2) This control is valid when the room air temperature is in the range of 10 to 40°C at cooling and dehumidification operation.
(3) Values in ( ) are SCM60, SCM80.

(6) Crankcase heater

(a) Operating conditions (When all the conditions below are satisfied)

① After the operation mode is changed to stop and the decision speed becomes 0 rps continuously for 30 minutes.

② When the temperature detected by the outdoor temperature sensor is 10°C or lower after the compressor stops.

(b) Detail of operation

The crankcase heater operates, warming up the compressor, then refrigerant begins circulating smoothly when the cooler starts its heating operation, and heating begins.

(c) Restoration conditions

When the temperature detected by the outdoor temperature sensor reaches 12°C or higher, or the operation mode changes from stop to cooling or heating.

(7) Inching prevention

When the compressor becomes to the thermo operation within 3 minutes since operation start or becomes dehumidifying operation, the operation is continued with the indoor command speed of 16 rps forcibly.

(8) Cooling overload protection control

During cooling operation, if the outdoor unit is operating at a decision speed other than 0 rps and the outdoor temperature is 39°C (SCM40 type: 37°C) or more for 30 continuous seconds, current safe control is performed by turning the outdoor fan motor is forcedly set on 6 th speed. Operation is restored when the outdoor temperature is 38°C (SCM40 type: 36°C) or less.

(9) Cooling low load protection control (SCM45ZF-S, SCM60ZF-S only)

(a) Operating condition: During cooling operation , when the outdoor air temperature (Tho-A) is 22°C or lower for 3 minutes continuously.

(b) Detail of operation: Taking the lower limit of decision speed range at 22 rps (60 type: 20 rps).

(c) Reset condition: When the outdoor air temperature (Tho-A) is 24°C or higher.

(l0) Cooling low outdoor temperature protective control (SCM40ZF-S, SCM48ZF-S, SCM80ZF-S only)

♦ **<I>**

(a) Operating conditions: When the outdoor air temperature sensor (Tho-A) is 22°C or lower continues for 30 seconds while decision speed is other than 0 rps.

(b) Detail of operation: The outdoor fan is controlled in accordance with the outdoor heat exchanger temperature.

(c) Reset conditions: When the either of the following conditions is satisfied

① When the outdoor air temperature sensor (Tho-A) becomes 24°C or higher.

② When the decision speed is 0 rps.

Note (1) Values in ( ) are SCM80.

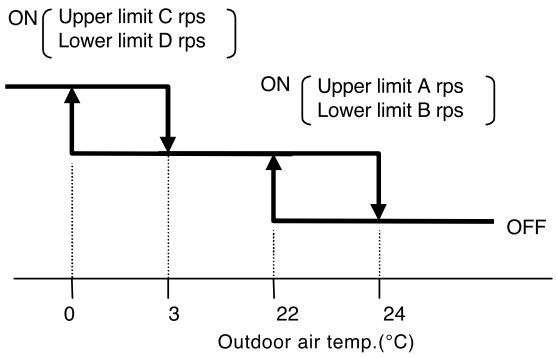
♦ **<II>**

(a) Operating conditions: When the outdoor air temperature sensor (Tho-A) is 22°C or lower continues for 30 seconds while decision speed is other than 0 rps.

(b) Detail of operation:

① The lower limit of decision speed is set to B (or D) rps and even if the speed becomes lower than B (or D) rps, the speed is kept to B (or D) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

② The upper limit of decision speed is set to A (or C) rps, the speed is kept to A (or C) rps.



• Values of A ~ D

	SCM40ZF-S	SCM48ZF-S	SCM80ZF-S
A	80 rps	96 rps	60 rps
B	35 rps	29 rps	20 rps
C	64 rps	64 rps	50 rps
D	60 rps	54 rps	30 rps

(c) Reset conditions: When the either of the following condition is satisfied

① When the outdoor air temperature sensor (Tho-A) becomes 24°C or higher.

② When the decision speed is 0rps.

(11) Heating overload protection control

♦ **Indoor unit side**

(a) Operating conditions: When the outdoor unit is heating at a decision speed other than 0 rps and the outdoor air temperature (detected by Tho-A) rose beyond 17°C for 2 minutes continuously.

(b) Detail of operation

1) Indoor fan speed is raised forcibly by 1 step.

2) Taking the upper limit of control speed range at 80 (50, 60 type: 60) rps, if the indoor command speed exceeds the upper limit, the upper limit value is maintained.

(c) Reset conditions: When the outdoor air temperature drops below 16°C.

♦ **Outdoor unit side**

During heating operation, if the outdoor unit is operating at a decision speed other than 0 rps and the outdoor temperature is A°C or more for 30 continuous seconds, current safe control is performed.

Operation is restored when the outdoor temperature is B°C or less.

• Values of A, B

Model	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
A	13 °C	12 °C	14 °C	14 °C	14 °C
B	12 °C	11 °C	12 °C	12 °C	12 °C

(12) Heating low temperature protection control

♦ **<I>**

(a) Operating conditions: When the outdoor unit is heating at a decision speed other than 0 rps and the temperature of the outdoor air sensor is 4°C or lower for 5 minutes continuously.

(b) Detail of condition: When the decision speed is lower than A rps, the decision speed is forcedly raised to A rps.

(c) Reset condition: When the temperature of the outdoor air sensor is higher than 6°C.

• Value of A

Model	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
A	35 rps	22 rps	22 rps	20 rps	20 rps

♦ **<II>**

(a) Operating conditions: When the outdoor unit is heating at a decision speed other than 0 rps and the temperature of the outdoor air sensor is 0°C or lower for 5 minutes continuously.

(b) Detail of condition: The outdoor fan speed is raised forcibly by 1 step.

(c) Reset condition: When the temperature of the outdoor air sensor is higher than 2°C.

♦ **<III>**

The compressor's speed is controlled in accordance with the outdoor heat exchanger temperature and outdoor air temperature.

(13) Current safe control

(a) When converter in port current is detected at the current sensor (CT) and it exceeds the set amperage, the decision speed is reduced. This is rechecked after one second and if it still exceeds the set amperage, the decision speed is reduced 2 rps.

(b) If the decision speed operated at A rps or less, the compressor is stopped. It is restarted after a 3 minute delay.

• Values of A

Model	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
A	35 rps	30 rps	30 rps	20 rps	20 rps

(14) Current cut

This detects converter output current at the shunt resistor and if it exceeds the set value, the compressor is stopped. It is restarted after a 3 minute delay.

(15) Outdoor fan motor protection

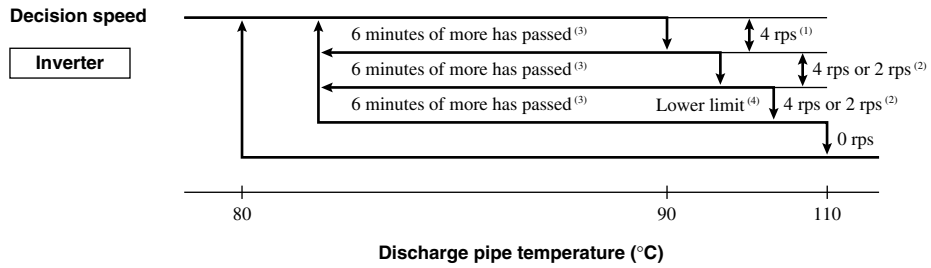
If the outdoor fan motor has operated at 75rpm or under for more than 30 seconds, the inverter and fan motor are stopped.

(16) Compressor overheat protection

The detection temperature of the discharge pipe sensor (Tho-D) is used to prevent oil deterioration and damage to the motor wire due to overheating of the compressor.

(a) If Tho-D becomes ≧110 °C, the compressor is stopped. After the stop mode has been activated, the compressor will be restarted when Tho-D becomes < 80 °C. However, if it is restarted repeatedly within an interval of 1 hour, it will not start on the 3 times.

(b) When 90 °C ≦ Tho-D < 110 °C, the following decision speed controls are performed.



Notes (1) If the temperature of the discharge pipe is 90 °C or more and less than 110 °C, the decision speed is reduced by 4 rps.

(2) After 20 seconds, if the temperature of the discharge pipe has decreased, it is lowered 2 rps. If the temperature has risen or is the same, it is lowered another 4 rps.

(3) If the temperature of the discharge pipe is 80 °C or more and less than 90 °C, the decision speed is maintained. If operation is maintained at the same speed for 6 minutes or more or if the temperature is 80 °C or less, control is returned to normal operation.

(4)

	Lower limit speed
40 ~ 48 type	35 rps
60 ~ 80 type	20 rps

(17) Power transistor overheat protection

(a) Purpose: In order to prevent the power transistor overheating during operation, faulty controller operations, deterioration, damage and so on occurs.

(b) Detail of operation:

① Power transistor sensor temperature ≧ 110°C

The compressor is stopped immediately. When the power transistor sensor temperature is less than 80°C, restart.

② 90°C ≦ Power transistor sensor temperature < 110°C

The decision speed drops to 4 rps. After 20 seconds, the decision speed performs the following controls, according to the power thansistor sensor temperature.

If the previous sensor temperature ≦ current sensor temperature	reduce by 4rps
If the previous sensor temperature > current sensor temperature	reduce by 2rps

	Lower limit speed
40 ~ 48 type	35 rps
60 ~ 80 type	20 rps

③ 80°C ≦ Power transistor sensor temperature < 90°C

Maintain the decision speed. When the rotation speed is the same for 6 minutes, or when the power transistor sensor temperature is less than 80°C. The speed is raised by 2rps and kept at that speed for 1 minute. This process is repeated until the decision speed is reached.

(18) Serial transmission abnormality protection

If the compressor is operating with a decision speed other than 0 rps and a serial signal cannot be received from all indoor controls with outdoor controls having serial signals other than “stop - 0 rps” continuously for 1 minute and 55 seconds, the compressor is stopped.

After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(19) Compressor lock

If the motor for the compressor does not turn 1/12 revolution 0.044 seconds after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(20) Discharge pipe sensor disconnection protection control

(a) When the decision speed is other than 0 rps.

1) Tho-D(10)−Tho-D(0) < A °C, and Tho-D(10)−Tho-A(10) < B °C

The decision speed is set on C rps for 5 minutes. After 5 minutes, the decision speed is set on D rps for E minutes.

2) Tho-D(20)−Tho-D(15) < 5 °C :

The decision speed is set on 0 rps.

(b) Once the unit is stopped by this function, it is not restarted.

Notes (1) Tho-D(X): After compressor operation, the discharge pipe sensor temperature after X minutes.
(2) Tho-A(X): After compressor operation, the outdoor air sensor temperature after X minutes.

• Values of A ~ E

Model	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
A	8 °C	10 °C	8 °C	8 °C	8 °C
B	5 °C	5 °C	5 °C	5 °C	5 °C
C	12 rps	12 rps	12 rps	10 rps	10 rps
D	64 rps	64 rps	64 rps	40 rps	40 rps
E	5 min.	3 min.	5 min.	5 min.	5 min.

(21) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air conditioning.

The compressor is stopped if any one of the following in item (a), (b) is satisfied. Once the unit is stopped by this function, it is not restarted.

(a) When the input current is measured at 1 A or less for 3 continuous minutes or more.

(b) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(22) Regulation of outdoor air flow

◆SCM40ZF-S

(a) The fan operates as follows according to the decision speed. (Except during defrost.)

	Cooling		Heating	
Decision speed	Less than 55	55 or more	Less than 60	60 or more
Outdoor fan speed	5th speed	6th speed	5th speed	6th speed

(b) If the outdoor unit's fan speed drops, the outdoor fan is run for 1 minute at that speed.

◆SCM45ZF-S

(a) The fan operates as follows according to the decision speed. (Except during defrost.)

	Cooling		Heating	
Decision speed	Less than 70	70 or more	Less than 70	70 or more
Outdoor fan speed	5th speed	6th speed	5th speed	6th speed

(b) If the outdoor unit's fan speed drops, the outdoor fan is run for 2 minutes at that speed.

◆SCM48ZF-S

(a) The fan operates as follows according to the decision speed. (Except during defrost.)

	Cooling		Heating	
Decision speed	Less than 70	70 or more	Less than 70	70 or more
Outdoor fan speed	5th speed	6th speed	5th speed	6th speed

(b) If the outdoor unit's fan speed drops, the outdoor fan is run for 1 minute at that speed.

◆SCM60ZF-S

(a) The fan operates as follows according to the decision speed. (Except during defrost.)

	Cooling		Heating	
Decision speed	Less than 40	40 or more	Less than 50	50 or more
Outdoor fan speed	5th speed	6th speed	5th speed	6th speed

(b) If the outdoor unit's fan speed drops, the outdoor fan is run for 2 minutes at that speed.

◆SCM80ZF-S

(a) The fan operates as follows according to the decision speed. (Except during defrost.)

	Cooling				Heating			
Decision speed	Less than 26	More than 26 but 38 or less	More than 38 but 54 or less	54 or more	Less than 26	More than 26 but 54 or less	More than 54 but 70 or less	70 or more
Outdoor fan speed	3rd speed	4th speed	5th speed	6th speed	3rd speed	4th speed	5th speed	6th speed

(b) If the outdoor unit's fan speed drops, the outdoor fan is run for 1 minute at that speed.

5 APPLICATION DATA

SAFETY PRECAUTIONS

- Please read these "Safety Precautions" first then accurately execute the installation work.
- Though the precautionary points indicated herein are divided under two headings, ⚠WARNING and ⚠CAUTION , those points which are related to the strong possibility of an installation done in error resulting in death or serious injury are listed in the ⚠WARNING section. However, there is also a possibility of serious consequences in relationship to the points listed in the ⚠CAUTION section as well. In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.
- After completing the installation, along with confirming that no abnormalities were seen from the operation tests, please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the owner's manual. Moreover, ask the customer to keep this sheet together with the owner's manual.

⚠ WARNING

- To disconnect the appliance from the mains supply this appliance must be connected to the mains by means of a circuit breaker or a switch (use a recognized 25A) with a contact separation of at least 3mm.
- The appliance shall be installed in accordance with national wiring regulations.
- This system should be applied to places as households, residences and the like. Application to inferior environment such as engineering shop could cause equipment malfunction.
- Please entrust installation to either the company which sold you the equipment or to a professional contractor. Defects from improper installations can be the cause of water leakage, electric shocks and fires.
- Execute the installation accurately, based on following the installation manual. Again, improper installations can result in water leakage, electric shocks and fires.
- For installation, confirm that the installation site can sufficiently support heavy weight. When strength is insufficient, injury can result from a falling of the unit.
- For electrical work, please see that a licensed electrician executes the work while following the safety standards related to electrical equipment, and local regulations as well as the installation instructions, and that only exclusive use circuits are used.
  Insufficient power source circuit capacity and defective installment execution can be the cause of electric shocks and fires.
- Accurately connect wiring using the proper cable, and insure that the external force of the cable is not conducted to the terminal connection part, through properly securing it. Improper connection or securing can result in heat generation or fire.
- Take care that wiring does not rise upward ,and accurately install the lid/service panel.It's improper installation can also result in heat generation or fire.
- When setting up or moving the location of the air conditioner, do not mix air etc. or anything other than the designated refrigerant (R410A) within the refrigeration cycle.
  Rupture and injury caused by abnormal high pressure can result from such mixing.
- Always use accessory parts and authorized parts for installation construction. Using parts not authorized by this company can result in water leakage, electric shock, fire and refrigerant leakage.
- Ventilate the work area when refrigerant leaks during the operation.
  Coming in contact with fire, refrigerant could generate toxic gas.
- Confirm after the foundation construction work that refrigerant does not leak.
  If coming in contact with fire of a fan heater, a stove or movable cooking stove, etc., refrigerant leaking in the room could generate toxic gas.
- In joining pipes, do not use conventional (R22) pipng flare nuts, etc. The use of conventional pipng materials may lead to the rapture of piping due to higher pressure used for the refrigerant cycle and possible personal injury.
  (Use only piping material designed specifically for R410A)
- If the power cord becomes damaged, ask your dealer or qualified enginner to install the replacement to avoid accidents.
- Beware of the Alminume fins, the Flare of pipes, Top screw, and etc. You could injure your fingers, etc.
- When working at high place, be careful not to drop tools.

⚠ CAUTION

- Execute proper grounding. Do not connect the ground wire to a gas pipe, water pipe, lightning rod or a telephone ground wire.
  Improper placement of ground wires can result in electric shock.
- The installation of an earth leakage breaker is necessary depending on the established location of the unit.
  Not installing an earth leakage breaker may result in electric shock.
- Do not install the unit where there is a concern about leakage of combustible gas.
  The rare even of leaked gas collecting around the unit could result in an outbreak of fire.
- For the drain pipe, follow the installation manual to insure that it allows proper drainage and thermally insulate it to prevent condensation. Inadequate plumbing can result in water leakage and water damage to interior items.
- Do not install an outdoor unit where rodents or other small animals are likely to inhabit.
  Small animals entering the unit can cause a unit breakdown or an accident involving smoke generation and/or ignition, if they touch electrical parts in side. Please ask the customer to keep its surroundings clean.

5.1 Installation of indoor unit

(1) Wall mounted type (SKM)

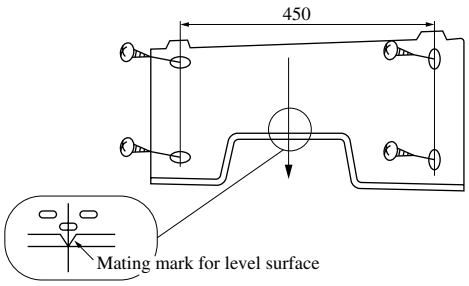
(a) Caution for installation

1) The system should be applied to places as households, residences and the like.
2) The equipment shall be installed in accordance with national wiring regulations.
3) The connection to the fixed wiring of the mains supply must be made via a double pole isolating switch with a contact gap of at least 3mm in each pole.
4) When the outdoor unit has a possibility of being overturned or being displaced and fall from its original installation position, the outdoor unit should be fixed in its position by the use of anchor bolts or wires.

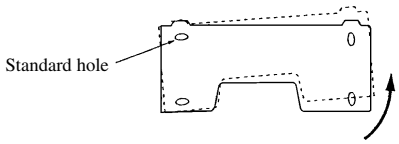
(b) Installation of indoor unit

1) Fixing of installation Board

- Look for the inside wall structures (Intersediate support or pillar and firaly install the unit after level surface has been checked.)

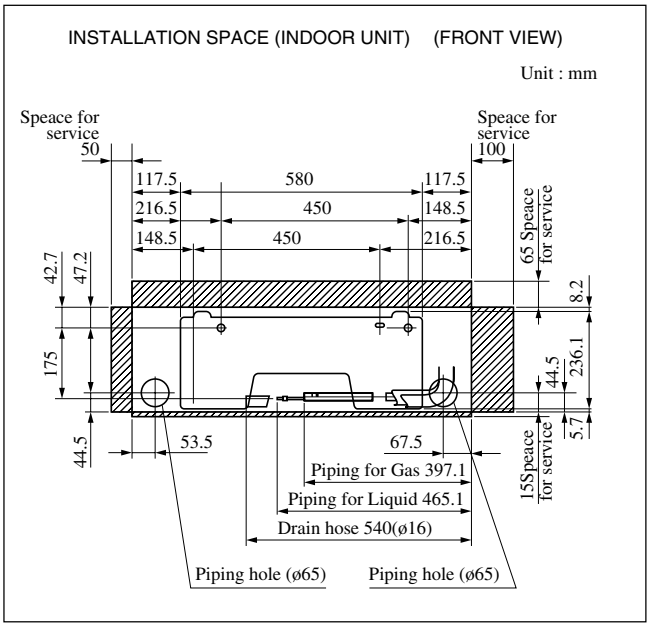


- Adjustment of the installation board in the horizontal direction is to be conducted with four screws in a temporary tightened state.



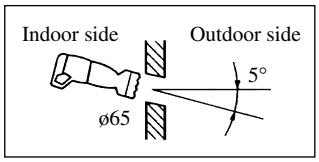
- Adjust so that board will be level by turning the board with the standard hole as the center.

Installation space (Indoor unit)

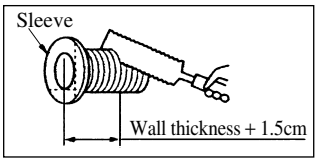


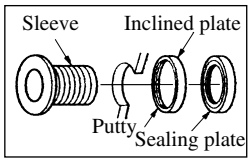
2) Drilling of holes and fixture of sleeve (Option parts)

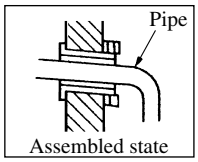
- The connecting wires may touch the metal inside the wall and cause danger so it is necessary to always use the sleeve.



- Drill a hole with a 65 whole core drill.





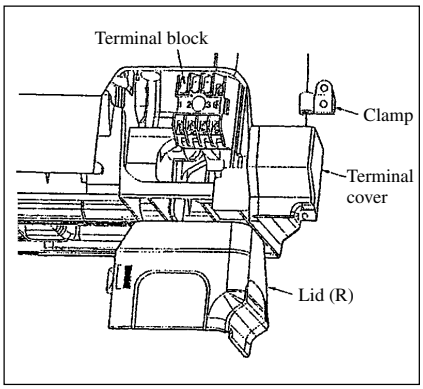


- When the pipe is connected at the rear, cut off the lower and the right side portions of the sleeve collar (as shown by the broken line.)

3) Mounting of interconnecting wires (Field wiring)

a) Remove the lid.
b) Remove the terminal block cover.
c) Connect the connection wire securely to the terminal block.

Use cables for interconnection wiring to avoid loosening of the wires.
CENELEC code for cables Required field cables.
H05RNR4G1.5 (Example)
H Harmonized cable type
05 300/500 volts
R Natural-and/or synth. rubber wire insulation
N Polychloroprene rubber conductors insulation
R Stranded core
4 Number of conductors
G One conductor of the cable is the earth conductor (yellow/green)
1.5 Section of copper wire (mm^2)

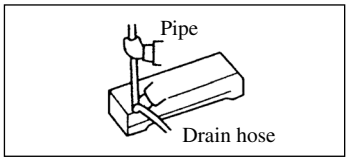


1) Connect the connection wire securely to the terminal block. If the wire is not affixed completely, contact will be poor, and it is dangerous as the terminal block may heat up and catch fire.
2) Take care not to confuse the terminal numbers for indoor and outdoor connections.
3) Affix the connection wire using the wiring clamp.

d) Attach the terminal block cover.
e) Attach the lid.

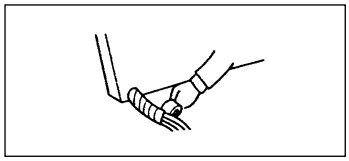
4) Shaping the pipe and drain hose

[Shaping the pipe]



- Hold the bottom of the pipe and change its direction before stretching it and shaping it.

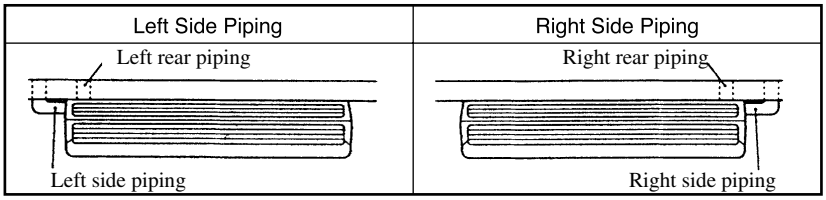
[Taping of the exterior]



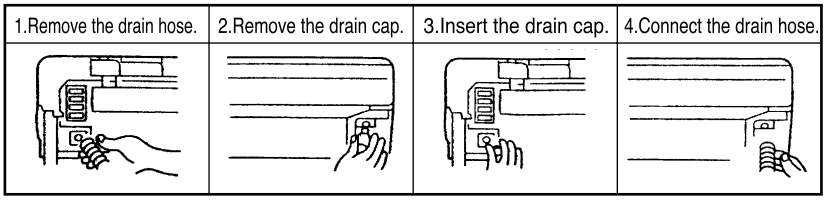
- Tape only the portion that runs through the wall. Always tape the crossover wires with the pipe.

Cautions when piping from the left and the rear center of the unit

[Top View]

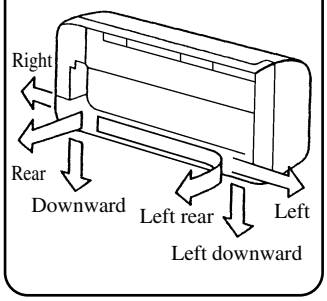


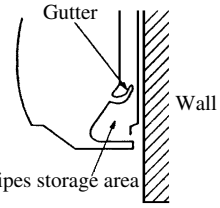
[Procedure for exchanging the drain hose.]



- Loosen and remove the spring-type clamp.
- Remove with your hand or a pair of pliers.
- Use a hexagonal wrench to correctly insert the drain cap which was removed in 2.
  Caution: Be careful because if the cap is not inserted property, water leak may occur.
- Loosen the spring-type clamp and securely insert the drain hose.
  Caution: Be careful because if the cap is not inserted properly, water leak may occur.

The piping can be removed from the rear, left, left rear, right and from under the unit.

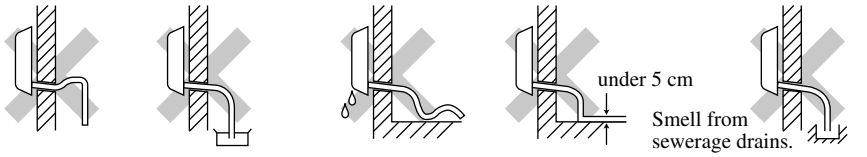




- Do not place the power supply cords above the gutter, because the air conditioner is structured in a way where condensation on the back side is collected in to the drain pan before drainage.

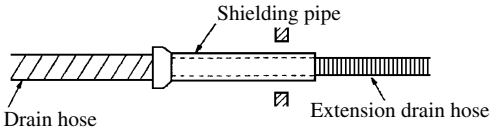
Drainage

- The drain hose must be fit with a downward slope.
- Do not set the drain hose like the following illustrations.



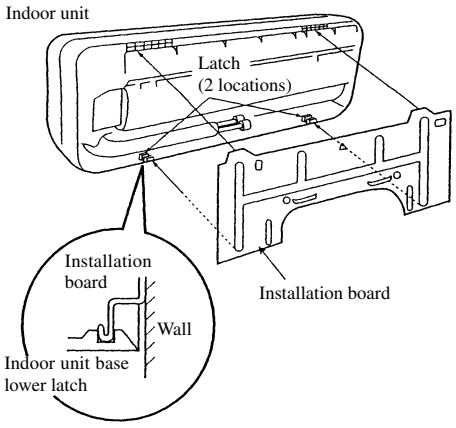
Too high | The end of the drain hose is touching the water. | It curves like a wave. | The gap to the ground is less than 5 cm. | The end of the drain hose is touching the sewage drains.

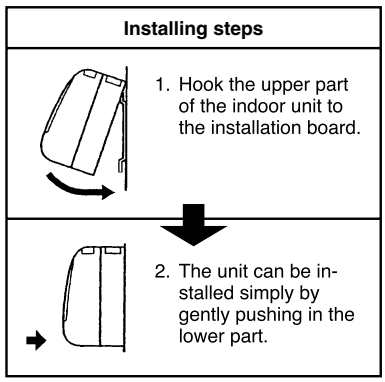
- Pour water in the drain pan below the heat exchanger and confirm that the water is drained outside.
- If the extension drain hose is indoors, make sure it is insulated using a shielding pipe (not supplied).



when a part of the extension drain hose is indoors

5) Securing the Indoor Unit to the Installation Board




Installing steps
1. Hook the upper part of the indoor unit to the installation board.
2. The unit can be installed simply by gently pushing in the lower part.

(2) 4-way ceiling cassette type (STM)

(a) Caution for installation

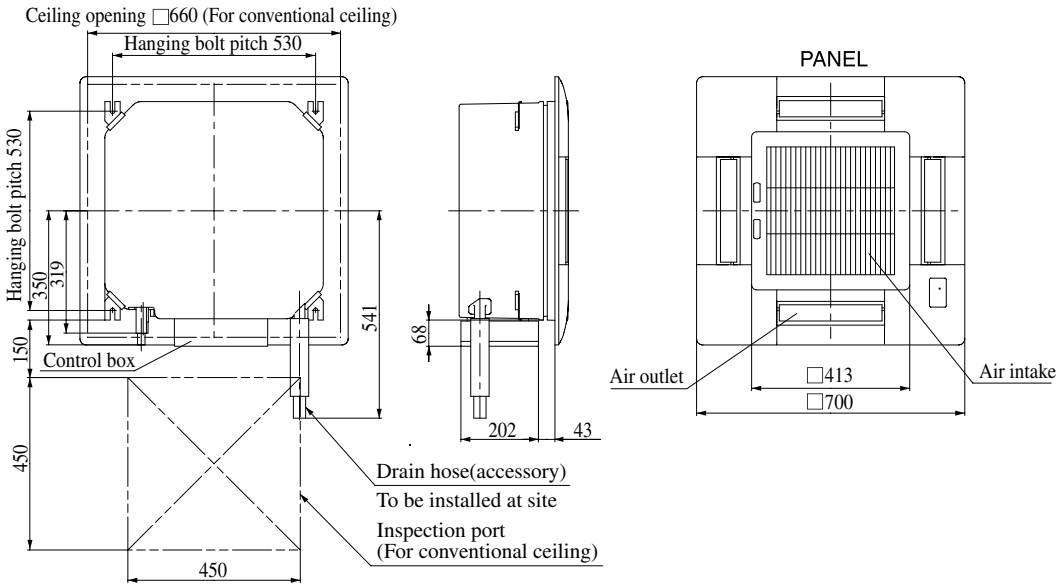
Install at location that meets the following conditons after getting approval from the customer.

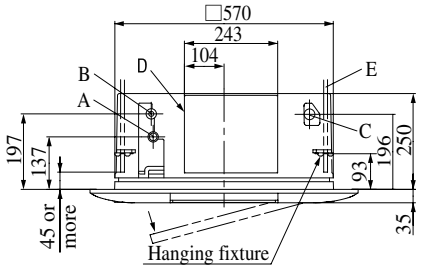
1) Where cool air or hot air can easily pass through.
   If the height of the location exceeds 3 m, hot air will gather in the ceiling. Suggest to the customer to also install a circulator.
2) Where there are no wind disturbances to the suction inlet and blowing outlet, where the fire alarm will not be set off erroneously, where no short circuits occur.
3) Where there is no obstructions to the air flow and where the cooled air can be evenly distributed.
4) A solid place where the unit or the wall will not vibrate.
5) A place where there will be enough space for servicing.
   (Where space mentioned below can be secured)
6) Where wiring and the piping work will be easy to conduct.
7) The place where receiving part is not exposed to the direct rays of the sun or the strong rays of the street illumination.
8) When a sufficient interval cannot be secured between the unit and a wall or another unit, shut up diffusers on that side to block winds and make sure that no short-circuiting is occurring.
   (A wind blocking material is available as an optional part)
   ▶Do not use the unit in the "Lo" wind mode, when winds are blown into two or three directions.

(b) Installation of indoor unit

1) Installation dimensions

Unit: mm

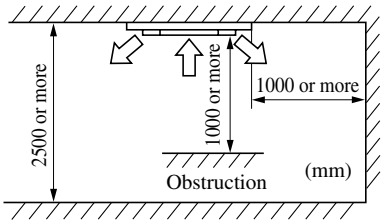




Mark	Description		
	Model	25, 35ZF-S	50, 60ZF-S
A	Gas tube connecting port	ø9.52 (Flare)	ø12.7 (Flare)
B	Liquid tube connecting port	ø6.35 (Flare)	
C	Drain line tube connecting port	VP25*	
D	Power intake		
E	Hanging bolt	(M10 or M8)	

* Please arrange VP25 connector sockets on the installer's part.

Installation Space (front view) (unit: mm)



2) Drilling of holes in the wall and fixture of sleeve

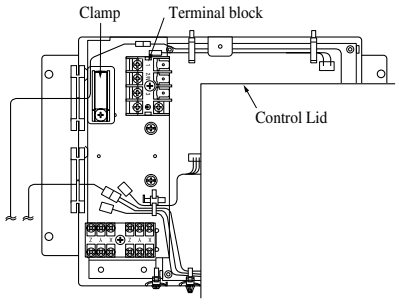
The instructions for installation is the same as the SKM type. Please refer to page 67.

3) Preparations for the Main Frame

Mounting of interconnecting wires (Field wiring)

a) Remove the control lid.

b) Connect the connection wire securely to the terminal block.



Use cables for interconnection wiring to avoid loosening of the wires.
CENELEC code for cables Required field cables.
H05RNR4G1.5 (Example)
H Harmonized cable type
05 300/500 volts
R Natural-and/or synth. rubber wire insulation
N Polychloroprene rubber conductors insulation
R Stranded core
4 Number of conductors
G One conductor of the cable is the earth conductor (yellow/green)
1.5 Section of copper wire (mm^2)

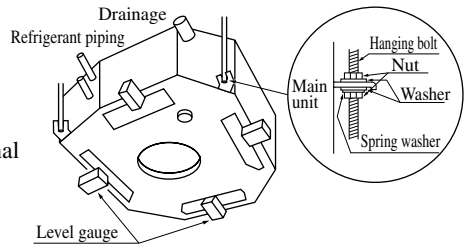
1) Connect the connection wire securely to the terminal block. If the wire is not affixed completely, contact will be poor, and it is dangerous as the terminal block may heat up and catch fire.
2) Take care not to confuse the terminal numbers for indoor and outdoor connections.
3) Affix the connection wire using the wiring clamp.

c) Attach the control lid.

4) Hanging the unit

Please arrange four sets of a hanging bolt (M10 or M8), a nut matching the bolt, a flat washer and a spring washer on the installation site.

A . When hanging from the ceiling



a) When installing on a 2′ x 2′ grid ceiling, if necessary, please detach the T bar temporarily before you install it. When installing on a conventional ceiling, cut an installation opening (660mm x 660mm) in the ceiling. When installing on a conventional ceiling, cut an opening (Min 450 x 450) for inspection purposes.

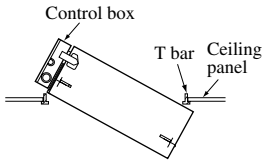
b) Determine the positions of hanging bolts (530 x 530).

c) Use four hanging bolts, each fastened in such a manner that it can withstand pull force of 50kgf.

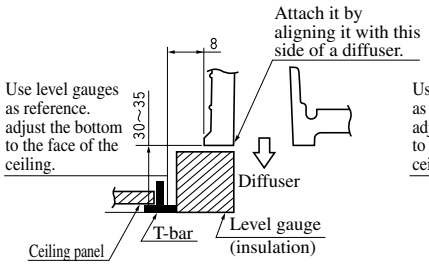
d) Make hanging bolts to the length that leaves approximately 45 mm of them above the ceiling. In hoisting the unit main body in, temporarily fasten the four lower nuts of the hanging bolts approx. 93 mm from the ceiling and the four upper nuts at positions sufficiently far from the lower nuts so that they may not hamper installation work when the unit is hoisted in or the height is adjusted.

e) Put the unit on an angle.

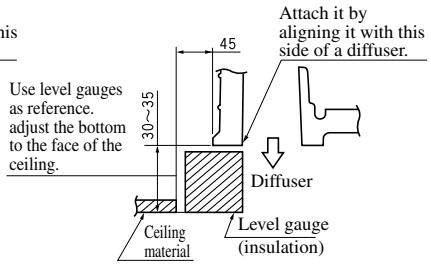
f) After hoisting in the unit , attach level gauges supplied as accessories and determine the unit position (height). To adjust height, use the four lower nuts with the four upper nuts left loose. Please make sure that the unit's four hanging fixtures touch the four lower nuts and washers evenly without any play.

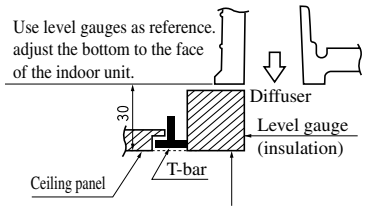


[For 2′ x 2′ grid ceiling]

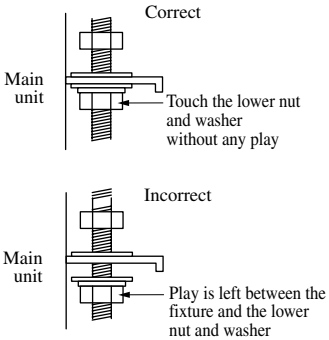

Attach it by aligning it with this side of a diffuser.
8
Use level gauges as reference. adjust the bottom to the face of the ceiling.
30~35
Diffuser
T-bar
Level gauge (insulation)
Ceiling panel

[For conventional ceiling]

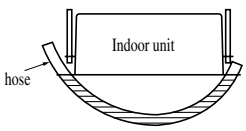

Attach it by aligning it with this side of a diffuser.
45
Use level gauges as reference. adjust the bottom to the face of the ceiling.
30~35
Diffuser
Ceiling material
Level gauge (insulation)



When the ceiling panel comes below the T bar, align the botom of the level gauges to the lower face of the ceiling panel.


Correct
Main unit
Touch the lower nut and washer without any play
Incorrect
Main unit
Play is left between the fixture and the lower nut and washer

g) Please make sure that the unit main body is installed levelly. Level must be checked with the level gauge or a clear hose filled with water. (A tolerable height difference at an end of the unit is within 3 mm)



h) After you have adjusted the height and level of the unit, fasten the four upper nuts to fix the unit.

Notes • Do not adjust the height with the upper nuts. It may cause deformation due to excessive force working on the unit main body, which can result in such problems that you cannot attach the panel or noises are generated from the interfering fan.

B. When embedded into ceiling

1. Determine the positions of hanging bolts (530 × 530).

   The pitch center of a hanging bolt must accord with the center of the unit.

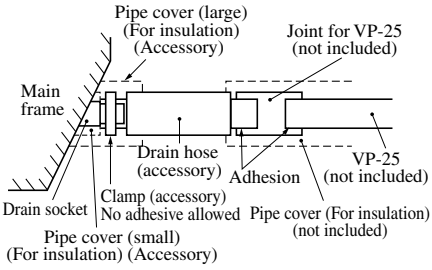
2. Use four hanging bolts, each fastened in such a manner that it can withstand pull force of 50kgf.

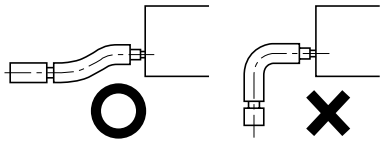
3. Fix the unit as per A-e ~ g previous page.

Notes • When a hanging bolt exceeds 1.3 m in length, use an M10 bolt and give it reinforcements such as braces.

5) Drainage

- Glue the drain hose supplied as an accessory and a VP-25 joint before lifting the unit.
- The drain hose is to provide a buffer to absorb a slight dislocation of the unit or the drain piping during installation work. If it is subject to abuse such as being bent or pulled deliberately, it may break, which will result in a water leak.
- Care must be taken so as not to allow an adhesive to run into the drain hose. When it is hardened, it can cause a breakage of a flexible part, if the flexible part receives stress.
- Use VP-25 general-purpose hard PVC pipes for drain piping.
- Insert the drain hose supplied as an accessory (soft PVC end) to the stepped part of the unit's drain socket and then fasten it with the clamp also supplied as an accessory.





<Adhesive must not be used>

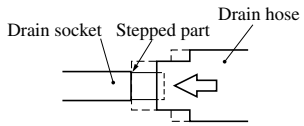
- Glue a VP-25 joint (to be procured locally) to join it with the drain hose (hard PVC end) and then glue a VP-25 (to be procured locally) to the joint.
- Give the drain piping a descending grade (1/50 - 1/100) and never create a bump to go over or a trap.
- In connecting drain pipes, care must be taken so as not to apply force to the unit side piping and fix the pipe at a point as close to the unit as possible.
- Do not create an air vent under any circumstances.
- When drain piping is implemented for more than one unit, provide a collecting main about 100 mm below the units' drain outlets from which it collects drain. Use a VP-30 or larger pipe for a collecting main.
- Do not fail to provide heat insulation at the following two points because they can cause dew condensation and a resultant water leak.

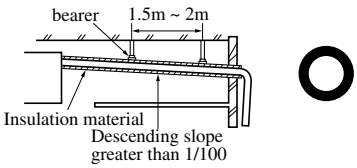
  • Drain socket

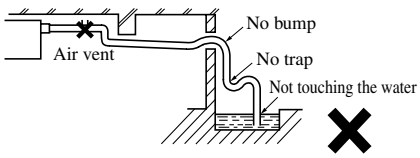
  After a drain test is completed, apply a pipe cover (small: accessory) onto the drain socket, cover the pipe cover (small), the clamp and part of the drain hose with a pipe cover (large: accessory) and wrap it with a tape completely without leaving any gaps.

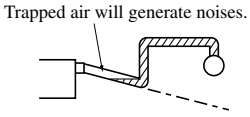
  (Cut pipe covers into appropriate shapes)

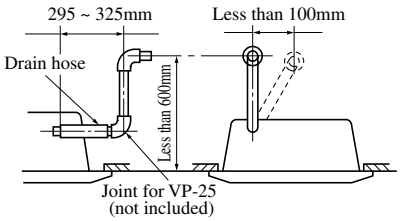
  • Hard PVC pipes laid indoor
- Since a drain pipe outlet can be raised up to 60 cm from the ceiling, use elbows, etc. to install drain pipes, if there are obstacles preventing normal drain pipe arrangement. When the drain pipe is raised at a point far from a unit, it can cause an overflow due to a back flow of drain upon stoppage, so arrange piping to keep the dimensions specified in the illustration shown on the right.
- Install the drain pipe outlet where no odor is likely to be generated.
- Do not lead the drain pipe into a ditch where the generation of harmful gas such as sulfuric gas or flammable gas is expected. A failure to observe this instruction may cause such harmful or flammable gas to flow into the room.











C. Attaching the panel

1) <Accessory items>

(It is attached to the panel.)

1	Hook		1 piece	For fixing temporarily
2	Chain		2 pieces	
3	Bolt		4 pieces	For hoisting the panel
4	Screw		1 piece	For attaching a hook
5	Screw		2 pieces	For attaching a chain

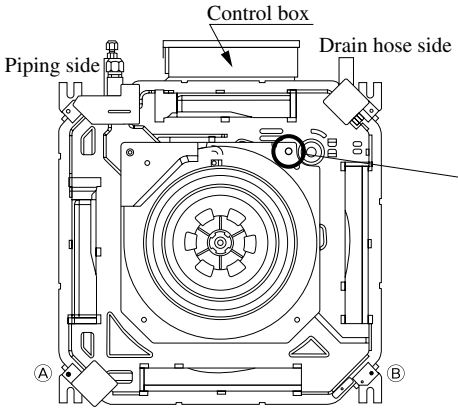
a) Make sure that the unit main body is positioned at the correct height and the opening on the ceiling is made to the correct dimensions with the level gauge supplied with the main body.
Remove the level gauge before you attach the panel.

b) Screw in two bolts out of the four supplied with the panel by about slightly less than 5mm.(mark Ⓐ Ⓑ)[Figure 1].

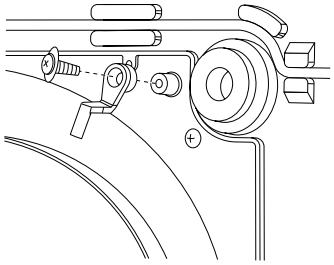
c) Attach the hook supplied with the panel to the main body with the hook fixing screw(1 screw).[figure 2]

d) Open the intake grille.

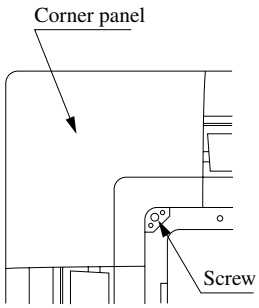
e) Please remove the screw of a corner panel and remove a corner panel.(four places) [Figure 3]



[Figure 1]



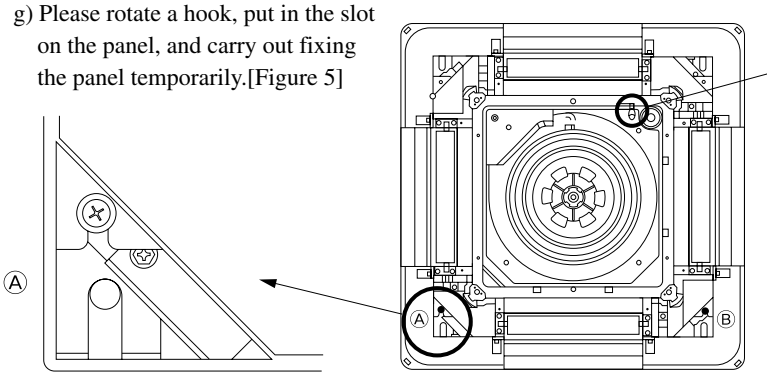
[Figure 2]



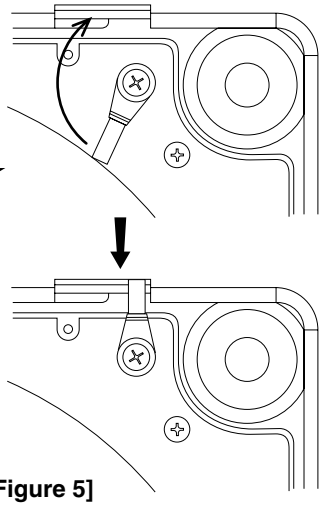
[Figure 3]

f) A panel is hooked on two bolts (● mark Ⓐ Ⓑ).[figure 4]

g) Please rotate a hook, put in the slot on the panel, and carry out fixing the panel temporarily.[Figure 5]



[Figure 4]

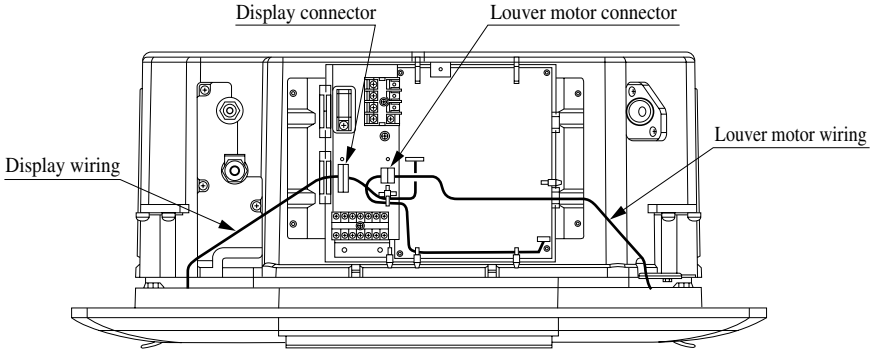


[Figure 5]

h) Tighten the two bolts used for fixing the panel temporarily and the other two.

i) Please open the lid of a control box.

j) Please connect a louver motor connector and Display connector. [Figure 6]

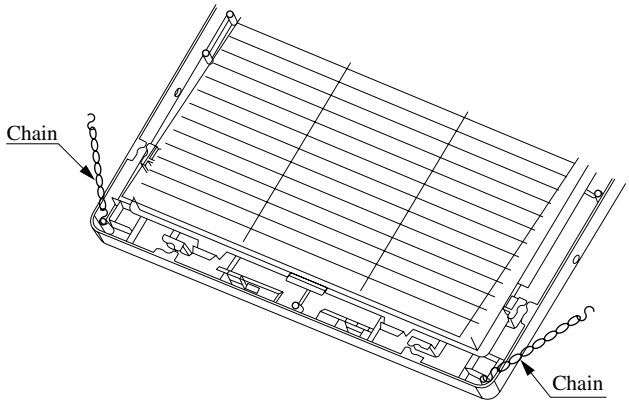


[Figure 6]

k) Attach two chains to the intake grille with two screws. [Figure 7]

l) Replace the corner panels. Please also close a chain with a screw together then.

m) Close the intake grille.



[Figure 7]

(3) Ducted type (SRRM)

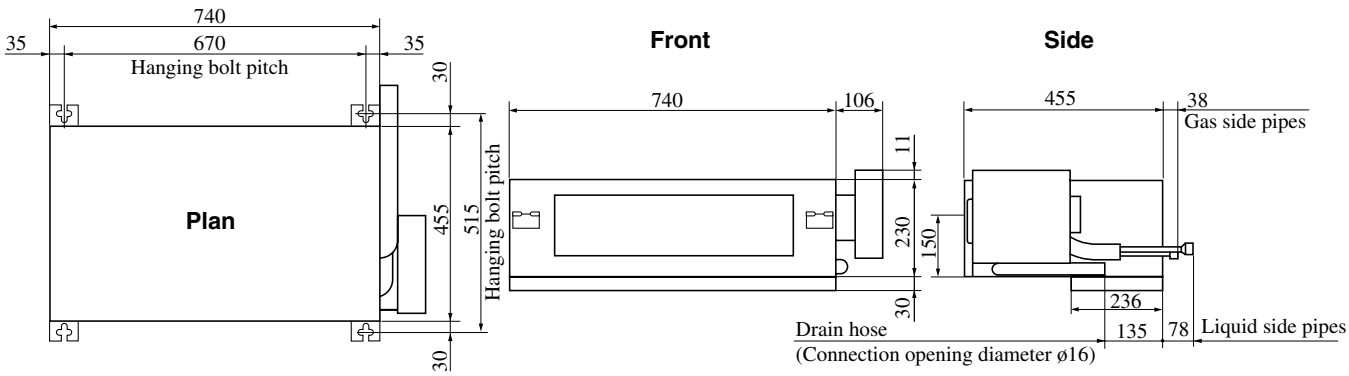
(a) Caution for installation

Install the unit with the customer's consent at location that meets the following conditions.

1) Where there are no barriers to the breeze, and where cool/hot air may diffuse throughout the room.
2) A firm location that may sustain the weight of the unit, and do not cause the unit or the ceiling to vibrate.
3) A location that allows room for maintenance.
4) Where wiring and plumbing may be performed with ease.
5) Where water may be drained easily.
6) Where the unit is not influenced by the television, stereo, radio, or the lights.
7) Where the unit is not influenced by high frequency equipment and wiring equipment.
8) Where oil splashes do not occur frequently.
9) Where sunlight and strong lights do not directly hit the receiver.
10) A flat ceiling surface (bottom of ceiling).

(b) Installation of indoor unit

1) Installation dimensions



2) Drilling of holes in the wall and fixture of sleeve

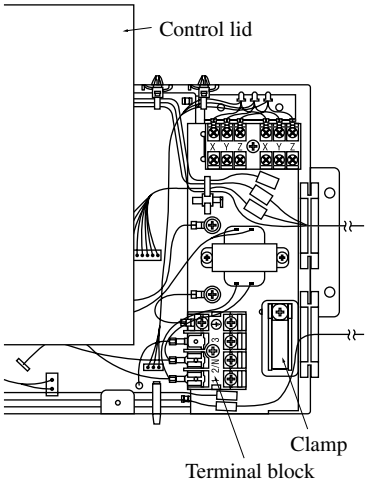
The instructions for installation is the same as the SKM type. Please refer to page 67.

3) Preparations for the Main Frame

Mounting of interconnecting wires (Field wiring)

a) Remove the control lid.

b) Connect the connection wire securely to the terminal block.



Use cables for interconnection wiring to avoid loosening of the wires.
CENELEC code for cables Required field cables.
H05RNR4G1.5 (Example)
H Harmonized cable type
05 300/500 volts
R Natural-and/or synth. rubber wire insulation
N Polychloroprene rubber conductors insulation
R Stranded core
4 Number of conductors
G One conductor of the cable is the earth conductor (yellow/green)
1.5 Section of copper wire (mm^2)

1) Connect the connection wire securely to the terminal block.
If the wire is not affixed completely, contact will be poor,
and it is dangerous as the terminal block may heat up and catch fire.

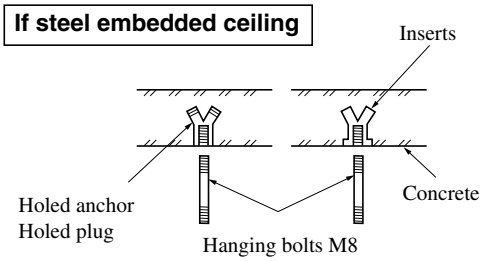
2) Take care not to confuse the terminal numbers for indoor and outdoor connections.

3) Affix the connection wire using the wiring clamp.

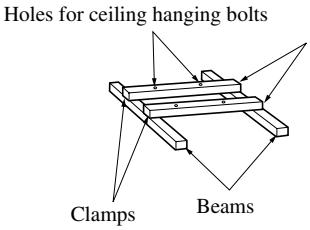
c) Attach the control lid.

4) Securing the Ceiling Hanging Bolts

If steel embedded ceiling



If wooden ceiling



• Secure the ceiling hanging bolts firmly following the illustrations and other instructions.

5) Filter guide set installation steps

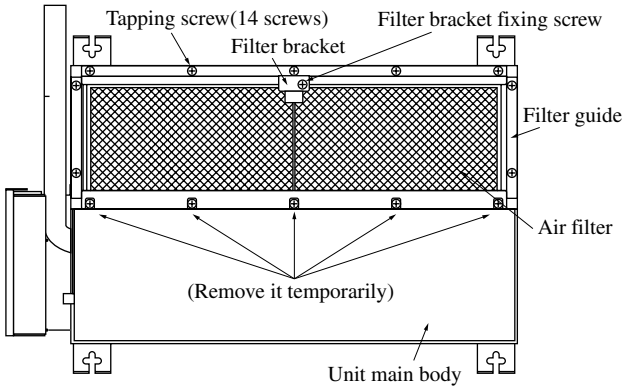
• Please attach the provided filter guide set.(When an option part (Lower suction grill set model RTS12)is attached, no need to attach the filter guide set.)

a) Remove the filter bracket fixing screws from the filter guide set first, and detach the filter bracket and the air filter in that order.

b) Remove the screws(5 screws)from the main unit.

c) Attach the filter guide to the main unit(with 14 fixing screws).

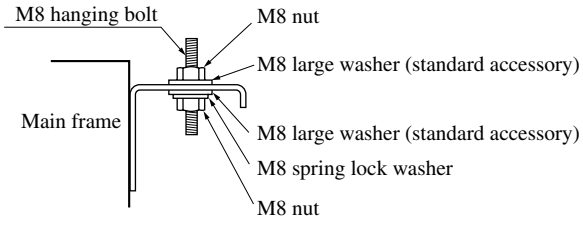
d) Attach the air filter onto the filter guide, and then, attach the filter bracket and the filter bracket fixing screws in that order.



6) Installing the Main Unit

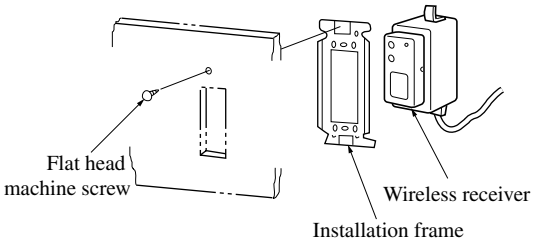
• Attach the washers and nuts to the ceiling hanging bolts.

• Attach the hanging tool to the above nuts, and tighten the nuts.



• If it is not leveled, the float switch may malfunction or may not start.

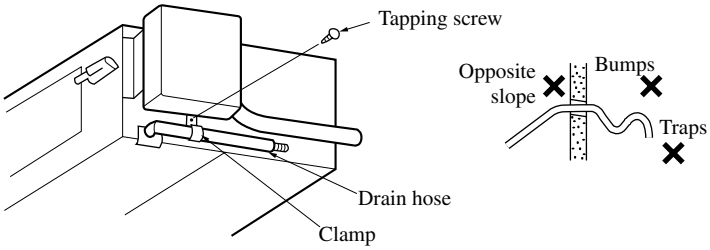
7) Securing the Wireless Receiver



• With a(–)screwdriver, secure the installation frame to the grooves on either sides of the wireless receiver.

• Refer to the installation instructions for each separately sold part, regarding the installing location of the wireless receiver.

8) Connecting the Drain Hose



NOTE

Conduct the installation correctly, and ensure that the water is draining correctly. It may lead to water leaks.

• Insert the drain hose as far as possible through the lower section of the side of the unit,and secure it with clamps.

• The drain hose should be set in a downward slope (over 1/100), and it should not have any bumps or traps along its route.

• When you are obliged to route the drain hose with a trap in its way or in an ascending gradient, please use an option part Drain up kit(RDU12E).

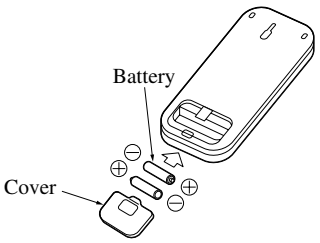
• The indoor drain hose must be insulated.

5.2 Installation of remote control

(1) Mounting method of battery

Uncover the remote control switch, and mount the batteries [R03 (UM-4), × 2 pieces] in the body regularly.

(Fit the poles with the indication marks, ⊕ & ⊖ without fail)

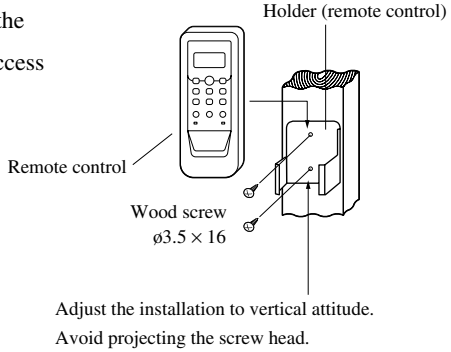


(2) Fixing to pillar or wall

(a) Conventionally, operate the remote control switch by holding in your hand.

(b) In the case of stationary operation service as by mounting on the holder for the remote control switch, make sure that the locating place is satisfactory for access service before installing it.

(c) Avoid installing it on a clay wall etc.



5.3 Installation of outdoor unit

(1) Selection of installation location

(Please install with the customer's consent in a location that follows the conditions listed below.)

(a) Where the following installation space is available, and where air does not gather.

(b) Where rain and sunlight do not directly hit the unit, and where there is enough air circulation.

(c) Also, where the unit cannot be buried by snow.

A location which can sustain the weight of the unit, and where noises and vibrations are not enhanced.

(d) Where blasts of cold or hot air and noise do not bother the neighbors.

(e) Where the unit does not receive heat radiation from other heat sources.

(f) Where there are no obstructions (animals, plants, etc.) to the suction inlet and blowing outlet.

(g) Where water may drain out.

(h) Please avoid the following locations.

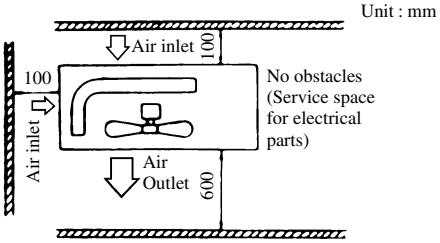
1) Where there is constant exposure to harsh winds such as the top floors of a building. Also, locations with exposure to salty air.

2) Where there are oil splashes, vapor, and smoke.

3) Where there are possibilities of flammable gas leaks.

(i) Do not install the unit near the seaside, or where there is possibillty of chlorine gas generation.

(j) Installation space (on a flat surface)



Notes (1) Blowing out port and suction port on the back side of the unit can be installed at a distance of 10cm from walls.
(In case the barrier is 1.2m or above in height, or is overhead, the sufficient space between the unit and wall shall be secured.)

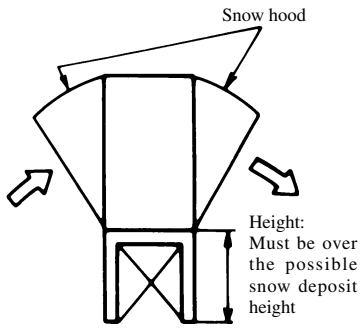
(2) When the unit is installed, the space of the following dimension and above shall be secured.

(k) In heating operation, snow deposit on the heat-exchanger of outdoor unit must be prevented for keeping the normal performance capacity.

(i) Snow-hood on outdoor unit as in drawing, will reduce the frequency of de-frost operation.

When installing the snow hood, take care so that the air outlet of the snow hood will not face directly into the most windy direction.

(ii) Design the base higher than possible snow deposit.



(2) Installation of outdoor unit

(a) Make sure that sufficient space for installation and service is secured.

(b) Fix the leg sections of the unit on a firm base which will not play.

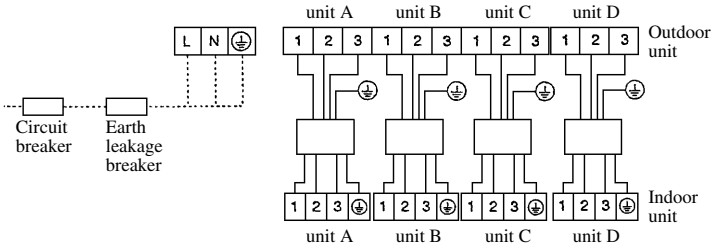
Attach cushion pads, etc. between the unit and the mounting fixtures not to transmit vibration to the building.

(c) Attach a drain elbow, etc. under the drain port of the bottom plate to guide drain water.

(Drain elbow should not be used where days when temperature drops below 0°C continue for several days. Draining may be disturbed by frozen water.)

(d) When installing the unit at a higher place or where it could be toppled with strong winds, secure the unit firmly with foundation bolts, wire, etc.

5.4 Electrical wiring



(1) Connection of the power lines

(a) This multi-type room air conditioner receives its power from outside.

(b) It is necessary to use a single phase 220/230/240 V 50 Hz for the power supply.

(c) An earth leakage breaker and a circuit breaker must be installed.

Their capacities are 25A.

(d) Use the power supply wires specified below. Different wires may cause heat generation and fire. Do not to use unspecified wires.

Never bundle, wind or treat the power wires. Otherwise, heat or fire may be generated.

Use cables for interconnection wiring to avoid loosening of the wires.
CENELEC code for cables Required field cables.
H05RNR3G4.0 (Example)

H	Harmonized cable type
05	300/500 volts
R	Natural-and/or synth. rubber wire insulation
N	Polychloroprene rubber conductors insulation
R	Stranded core
3	Number of conductors
G	One conductor of the cable is the earth conductor (yellow/green)
4.0	Section of copper wire (mm^2)

[POWER SUPPLY CODE]

CENELEC code for cables required field cables.

H05RNR3G4.0

(e) After connecting the power supply wires, make sure to secure the wires with wiring clamps.

(2) Connecting the outside/inside crossover wires

(a) Ensure that crossover wiring is matched with crossover piping in A, B, C and D rooms.

(b) Use the crossover wires specified below. Different wires may cause heat generation and fire. Do not to use unspecified wires.

[INTERCONNECTING WIRING CODE]

CENELEC code for cables required field cables.

H05RNR4G1.5

(c) Make sure the terminal numbers on the terminal board of the indoor and outdoor connections are correct.

(d) After connecting the crossover wires to the terminal board, use wiring clamps to secure the wiring.

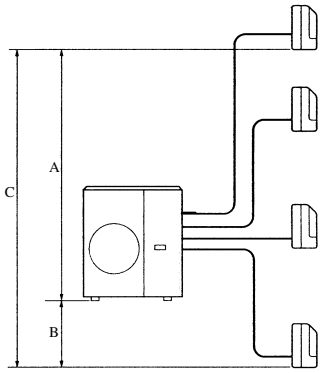
5.5 Refrigerant Piping

(1) Limit

The maximum permissible length of the refrigerant pipes for the outdoor units, and the maximum permissible height difference for the outdoor units are as shown below.

		SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
Length for one indoor unit		under 25m				
Total length for all rooms		under 30m		under 40m		under 70m
Height difference	Lower installation spot of the indoor unit A	under 15m				under 20m
	Upper installation spot of the indoor unit B	under 15m	under 10m	under 15m	under 10m	under 20m
	Maximum height difference of the indoor units C	under 25m				
Length of chargeless refrigerant pipe*		30m	20m	40m	30m	40m

* If the total length for all the rooms exceeds the length of chargeless refrigerant pipe, additionally charge with refrigerant according the item 4.



- **The diameter of the refrigerant pipe:**

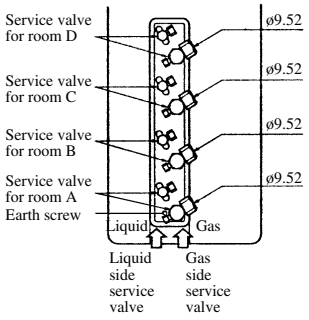
Class of indoor unit (kW)		2.0 · 2.2 · 2.5 · 2.8 · 3.5kW	5.0 · 6.0kW
Diameter of joint pipe	Liquid side	ø 6.35 · t 0.8	
	Gas side	ø 9.52 · t 0.8	ø 12.7 · t 0.8

- **Outdoor unit and the total connectable indoor units (class kW):**

	SCM40ZF-S	SCM45ZF-S	SCM48ZF-S	SCM60ZF-S	SCM80ZF-S
Total of indoor units (class kW)	5.6kW	7.0kW	8.5kW	11.0kW	13.5kW

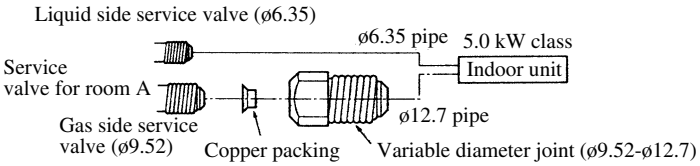
(2) Connection of refrigerant piping

- The service valve corresponding to each indoor unit is as illustrated in the right figure.
- Regarding the change in the sizes of gas side pipes (usage of the variable joints); if a 5.0 and 6.0 kW class indoor unit (gas side pipe 12.7) is going to be connected to the service valves (9.52), variable joints available as accessories must be applied to the gas side service valves.



[Examples of use of variable diameter joints]

Connection of indoor unit of Class 5.0 to A unit.

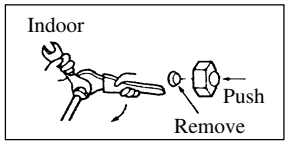


- Securely fit the copper packing between the service valve and the variable diameter joint to prevent shifting.
- Cover the pipes with tape so that dust and sand do not enter the pipe until they are connected.

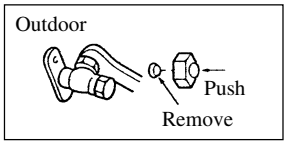
[Connection of pipes]

- When connecting the pipes to the outdoor unit, be careful about the discharge of fluorocarbon gas or oil.
- Make sure to match the pipes between the indoor unit and the outdoor unit with the correct service valves.

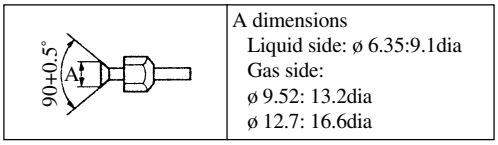
(1) Preparations



- Remove the flare nut (from both liquid and gas sides).



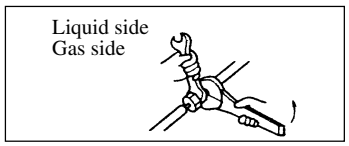
- Remove the flare nut (from both liquid and gas sides).



- Fit the removed flare nut to the joint pipe, and then flare it.

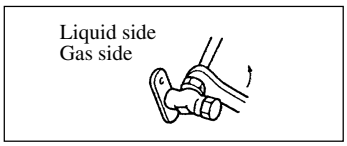
(2) Connection

Indoor



- Secure the nut with a specified tightening torque to avoid any gas leaks.

Outdoor



- Secure the nut with a specified tightening torque to avoid any gas leaks.

- Specified tightening torques are as follows:
  Liquid side (ø 6.35): 17mm in width across flat of the flare nut: 14.0-18.0 N·m (1.4-1.8 kgf·m)
  Gas side (ø 9.52): 22mm in width across flat of the flare nut: 34.0-42.0 N·m (3.4-4.2 kgf·m)
  Gas side (ø 12.7): 24mm in width across flat of the flare nut: 49.0-61.0 N·m (4.9-6.1 kgf·m)

(3) Air purging

To protect the global environment, use a vacuum pump that do not release flourocarbon gas into the atmosphere.
When a vacuum pump cannot be used due to certain conditions for installation, sufficient refrigerant is available for air purging with refrigerant for the outdoor unit.

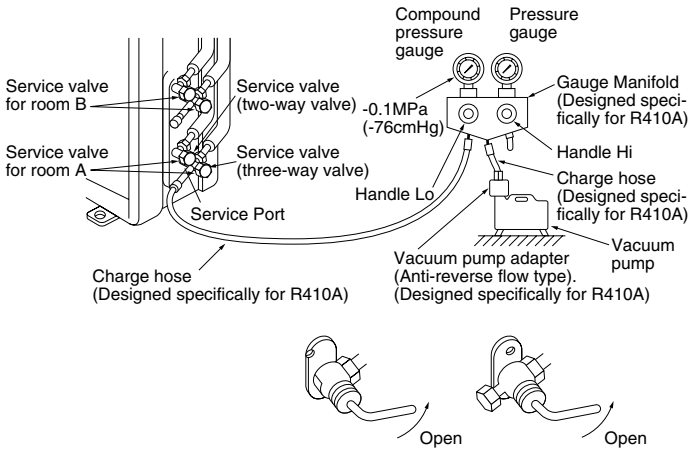
Note: Fully open the service valves (on both liquid and gas sides) after completing air purging

(a) Remove the cap on both gas and liquid sides before starting operation.
(b) After completing the operation, do not forget to tighten the cap (gas may leak).
(c) Conduct air purging for all connected indoor units.

- Since the system uses service ports differing in diameter from those found on the conventional models, a charge hose (for R22) presently in use is not applicable.
  Please use one designed specifically for R410A
- Please use an anti-reverse flow type vacuum pump adapter so as to prevent vacuum pump oil from running back into the system. Oil running back into an air-conditioning system may cause the refrigerant cycle to break down.

Procedure

① Secure all flare nuts on both indoor and outdoor sides to prevent leaks from the pipes.
② Connect the service valves, charge hose, manifold valve and vacuum pump as shown in the right figure.
③ Fully open the handle Lo for the manifold valve, and pump a vacuum for 15 minutes. Ensure that the meter is indicating -0.1 MPa (-76cmHg).
④ After vacuuming, fully open the service valve (both liquid and gas sides) with a hexagon wrench.
⑤ Remove the charge hose from service port.
⑥ Repeat the above steps ① ~ ⑤ for all connected indoor units.
⑦ Ensure that there are no gas leaks from the joints in the indoor and outdoor units.



(4) Additional refrigerant charge

- SCM40, 48 type
  Additional refrigerant charge is not required at all
- SCM45, 60, 80 type

(a) When the total refrigerant pipe length for all the rooms exceeds the length of the uncharged pipe, additional refrigerant is required.
(b) For this multi type room air conditioner, it is not necessary to charge the refrigerant for the total maximum length in all the rooms.

Model	Charged pipe length (Amount of uncharged refrigerant) *1	On site additional charge	Maximum total pipe length for all rooms (Maximum amount of refrigerant)
SCM45ZF-S	20m (1600g)	20g/m	30m (1800g)
SCM60ZF-S	30m (2200g)	20g/m	40m (2400g)
SCM80ZF-S	40m (3150g)	20g/m	70m (3750g)

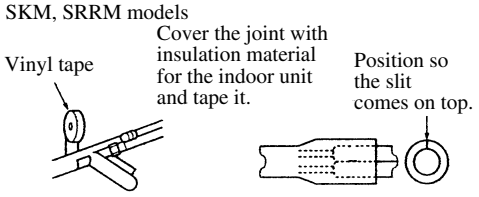
*1: Charge amount at the time of shipment.

(c) Ensure that there are no gas leaks from the pipe joints by using a leak detector or soap water.

(5) Heat insulation for joint

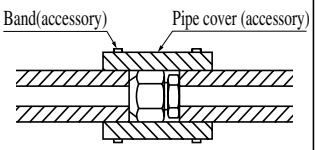
Heat insulation for joints

◆ SKM, SRRM models

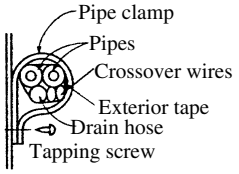


◆ STM model

- After checking each flare joint of the indoor unit for gas leaks, cover it with the attached insulating material and firmly secure with the attached bands at both ends.
- Do not twist or flatten pipes.
- Care must be taken so as to prevent debris, chips and water from entering the piping during installation work.



Finish and fixing



Apply exterior tape and shape along the place where the pipes will be routed. Secure to the wall with a pipe clamp. Be careful not to damage the pipes and the wires.

5.6 Test run and handling instruction

(1) Inspection

Check according to the following check items.

(2) Test run

(a) Conduct the test run after turning on the power for 20 minutes.
(To prevent compression of the compressor liquid.)

(b) If the compressor does not operate after the operation has started, wait for 5 ~ 10 minutes.
(This may be due to a delayed start.)

(c) Carry out the test run for each unit individually. (If 2 or 3 units are tested at the same time, wrong wiring and wrong pipe connections cannot be checked.)

(d) After each individual test, run the units in all the rooms simultaneously and check the units.

(e) Test both the cooler and the heater.

(Three-minute restart preventive timer)

When the air conditioner is restarted or when changing the operation, the unit will not start operating for approximately 3 minutes. This is to protect the unit and it is not a malfunction.

Installation test check points

Check the following points again after completion of the installation, and before turning on the power. Conduct a test run again and ensure that the unit operates properly. At the same time, explain to the customer how to use the unit and how to take care of the unit following the instruction manual.

After installation

- ☐ The power supply voltage is correct as the rating.
- ☐ No gas leaks from the joints of the service valve.
- ☐ Power cables and crossover wires are securely inserted and fixed to the terminal board.
- ☐ Each indoor and outdoor unit is properly connected (no wrong wiring or piping).
- ☐ Service valve is fully open.
- ☐ Refrigerant has been additionally charged (when the total pipe length exceeds the refrigerant charged pipe length).
- ☐ The pipe joints for indoor and outdoor pipes have been insulated.
- ☐ Earthing work has been conducted properly.

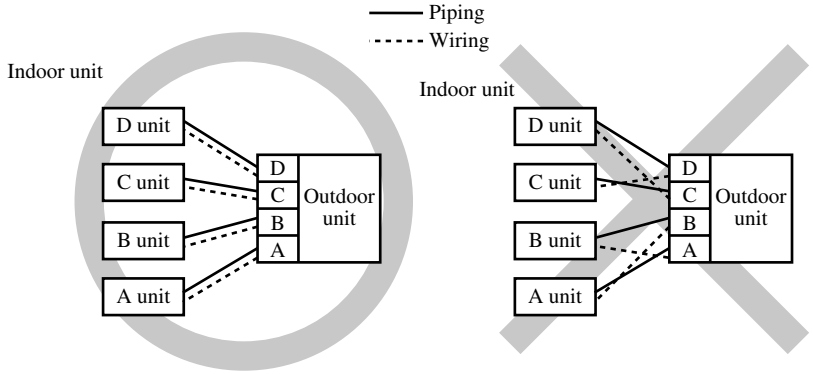
Test run

- ☐ Air conditioning and heating are normal.
- ☐ No abnormal noise.
- ☐ Water drains smoothly.
- ☐ Protective functions are not working.
- ☐ Operation of the unit has been explained to the customer.

Beware of wrong connections in refrigerant piping and wiring

- Make sure to match the piping and wiring from each unit to the outdoor unit.
- Be careful because if connections are wrong, normal operation cannot be achieved and may damage the compressor.

[Correct connections] [Example of wrong connections]

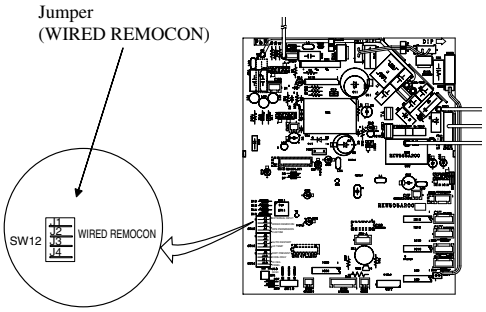


5.7 Installation of wired remote control and super link adapter (SC-AD-E) (Optional parts) (STM, SRRM only)

(1) Modifying the indoor unit's printed circuit board

- Cut the jumper (printed "WIRED REMOCON") attached on the board.

※ It is impossible to control by the wireless remote control after cutting the jumper.

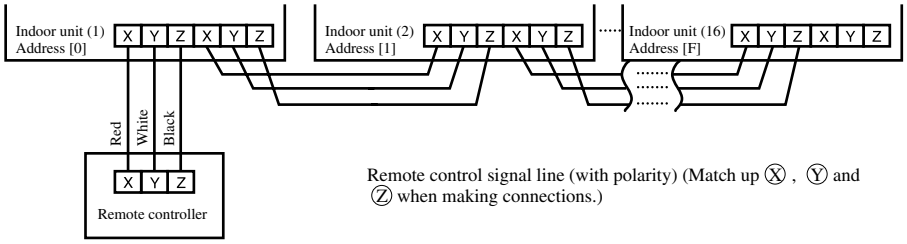


Notes (1) Controlling multiple indoor units using a single remote control.

- Up to 16 indoor units can be controlled with a single remote control.

a) Run 3-wire remote control lines between each of the indoor units. See "Cautions when extending remote control lines" on page 94 concerning extended remote control lines.

b) Set the remote control communications address on "0" ~ "F" using rotary switch SW11 on the indoor unit's control board, taking care not to overlap the addresses of any of the units.



c) After turning the power on, press the AIR CON No. button to display the indoor unit's address. Be sure to confirm that the settings are displayed correctly in the remote control by using the ▲ and ▼ buttons to display the address of each connected indoor unit.

(2) To connect the super link, the optional SC-AD-E (super link adapter) is required.

(2) Installation of wired remote control (Optional parts)

(a) Selection of installation location

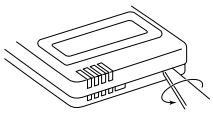
Avoid the following locations

1) Direct sunlight.
2) Close to heating device.
3) Highly humid or water splashing area.
4) Uneven surface.

(b) Installation procedure

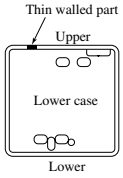
1) Exposed fiting

a) Open the remote control case.



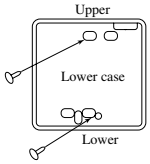
- Put a screw driver (flat-head) into the concavity made on the upper part of a remote control unit and twist it lightly to open the casing.

b) The cord of a remote control unit can only be pulled out in the upward direction.

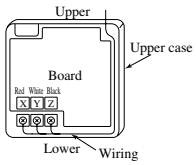


- Cut off with nippers or a knife a thin walled part made on the upper end of the remote control unit's bottom casing, and then remove burrs with a file or the like.

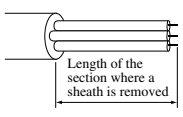
c) Fix the remote control unit's bottom casingonto a wall with two wood screws supplied as accessories.



d) Connect the remote control to the terminal block. Connect the terminals of the remote control to the indoor unit with the same numbers. Because the terminal block has polarity, the device becomes inoperative if there are wrong connections.
Terminals: ⓧRed wire, ⓨWhite wire, ⓩBlack wire



- Use a cord of 0.3mm^2 (recommended) - 0.5mm^2 (maximum) for a remote control unit cord. Remove a sheathe of the remote control unit cord for the section laid within the remote control unit casing.
  The length of each wire that should be left after a sheath is removed is as follows:



Black: 195mm, White: 205mm, Red: 215mm

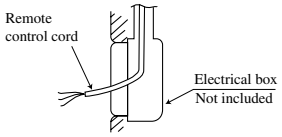
e) Replace the top casing as before.

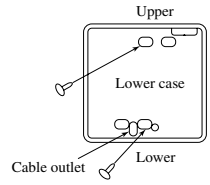
f) Use a cord clamp to attach the remote control cord to the wall.

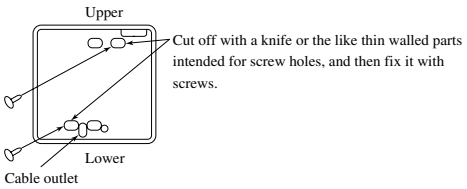
g) Set the functions according to the types of in door unit. See Section "Function Setting".

2) Recessed fitting

a) The Electrical box and remote control (shield wire must be use in case of extension) are first embedded.






Upper
Cut off with a knife or the like thin walled parts intended for screw holes, and then fix it with screws.
Lower
Cable outlet

b) Remove the upper case to the remote control.

c) Attach the lower case to the Electricl box with two M4 screws. (Head diameter must be 8 mm). Choose either of the following two positions in fixing it with screws.

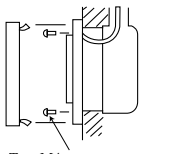
d) Connect the remote cord to the remote control.

Refer to [Exposed Fitting].

e) Installation work is completed by replacing the top casing onto the bottom casing as before.

f) Set the function switch according to the type of the indoor unit.

Refer to [Function setting].



Precation in Extending the Remote control cord

▶ Maximum total extension 600m.

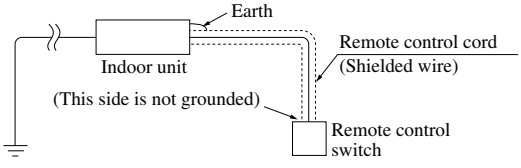
The cord should be a shielded wire.

● For all types : 0.3mm^2 × 3 cores

Note (1) Use cables up to 0.5mm^2 (maximum) for those laid inside the remote control unit casing and connect to a different size cable at a vicinity point outside the remote control unit, if necessary.

Within 100-200m····· 0.5 mm^2 × 3 cores
Within 300m····· 0.75 mm^2 × 3 cores
Within 400m····· 1.25 mm^2 × 3 cores
Within 600m····· 2.0 mm^2 × 3 cores

● The shielded wire should be grounded at one side only.



(3) Setting functions using the wired remote control

(a) The default settings of this unit's functions are as follows: If you want to charge a setting, follow the procedure found in the installation manual and set to your desired setting.

For the method of setting, please refer to the installation manual of a remote control unit.

① Remote control unit functions (FUNCTION ▼)

Function number Ⓐ	Function description Ⓑ	Setting Ⓒ	Default setting
(01)	GRILLE SET (Grille lift panel setting)	INVALID	○
		50Hz AREA ONLY	
		60Hz AREA ONLY	
02	AUTO RUN SET	AUTO RUN ON	○
		AUTO RUN OFF	
03	TEMP S/W	VALID	○
		INVALID	
04	MODE S/W	VALID	○
		INVALID	
05	ON/OFF S/W	VALID	○
		INVALID	
06	FANSPEED S/W	VALID	○
		INVALID	
07	LOUVER S/W	VALID	○
		INVALID	
08	TIMER S/W	VALID	○
		INVALID	
(09)	SENSOR S/W (Remote control sensor setting)	SENSOR OFF (Invalid)	○
		SENSOR ON (Valid)	
10	POWER FAILURE COMPENSATION SET	INVALID	○
		VALID	✻
(11)	VENTI SET	NO VENTI	○
		VENTI LINK SET	
		NO VENTI LINK	○
12	TEMP RANGE SET	DISP CHANGE	○
		NO DISP CHANGE	
13	I/U FAN SPEED (Indoor unit fan speed setting)	3 FAN SPEED	○
		2 FAN SPEED	
		1 FAN SPEED	
14	MODEL TYPE	HEAT PUMP	○
		COOLING ONLY	
15	EXTERNAL CONTROL SET	INDIVIDUAL OPERATION	○
		SAME OPERATION FOR ALL UNITS	
16	ERROR DISP SET	ERROR DISP	○
		NO ERROR DISP	
17	POSITION (Louver control setting)	FIX (1 OF 4) (4 position stop)	○
		IN MOTION (Free stop)	
(18)	°C/°F SET	°C	○
		°F	

Notes(1) Setting marked with [○] are the default setting.
(2) Setting marked with [✻] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.
(3) When Item 17 : " POSITION" is changed, please also change Item 04 " POSITION" setting found in "Indoor unit functions".
(4) The items described in ( ) in the function number Ⓐ cannot set.

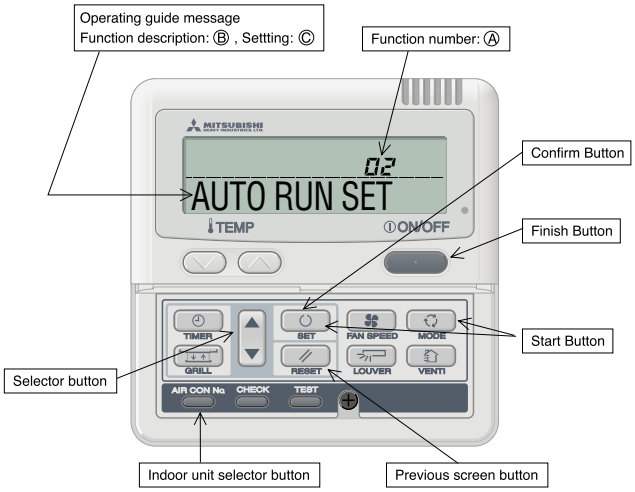
② Indoor unit functions (I/U FUNCTION ▲)

Function number Ⓐ	Function description Ⓑ	Setting Ⓒ	Default setting
(01)	Hi CEILING SET	STANDARD (Mild mode)	✻
		Hi CEILING 1 (Powerful mode)	
(03)	FILTER SIGN SET	NO DISPLAY	✻
		AFTER 180H	
		AFTER 600H	
		AFTER 1000H	
		1000H→STOP	
04	POSITION (Louver control setting)	FIX (1 OF 4) (4 positiion stop)	○
		IN MOTION (Free stop)	
05	EXTERNAL INPUT SET	LEVEL INPUT	○
		PULSE INPUT	
06	OPERATION PERMISSION PROHIBITED	NORMAL OPERATION	○
		VALID	
(07)	ROOM TEMP OFFSET (Heating room temperature offset)	NORMAL OPERATION	○
		TEMP SHIFT +3°C	
(08)	FAN CONTROL (Heating fan control)	LOW FAN	✻
		STOP→LOW FAN (Intermittent operation)	
(09)	FREEZE PREVENT TEMP	TEMP Hi	
		TEMP Lo	○
(10)	FREEZE PREVENT CONTROL	FAN CONTROL ON	○
		FAN CONTROL OFF	

Notes(1) Setting marked with [○] are the default setting.
(2) Setting marked with [✻] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.
(3) The items described in ( ) in the function number Ⓐ cannot set.

(b) Function setting method

1) Stop the air conditioner
2) Press the SET and MODE buttons simultaneously for 3 seconds or longer.
   The screen display will be switched as follows:
   "SELECT ITEM" →
   "SET" →
   "FUNCTION SET ▼ "



3) Press the SET button.
   The unit will enter the function setting mode. The screen display will charge to " FUNCTION ▼".
4) Check which category your desired setting belongs to, " FUNCTION ▼ (Remote control unit function)" or "I/U FUNCTION ▲" (Indoor unit function).
5) Press either ▲ or ▼ button.
   Select either " FUNCTION ▼ " or "I/U FUNCTION ▲".

6) Press the SET button.

When " FUNCTION▼ " is selected.

① "DATA LOADING" (blinking) → "FUNCTION"→
"01 GRILLE ↑↓ SET" (Function number: Ⓐ, Function description: Ⓑ)
The screen display will be switched like this.

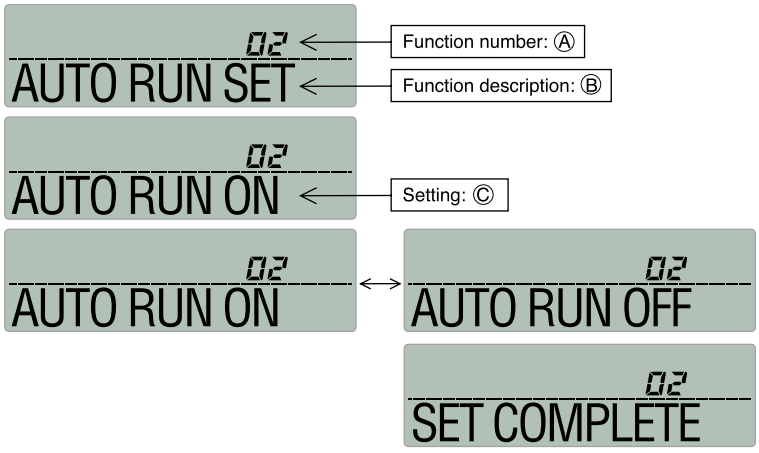
② Press either ▲ or ▼ button.
"Function number: Ⓐ, Function description: Ⓑ "from the list of remote control unit functions will be displayed one by one. Select a desired function.

③ Press the SET button.
The screen display will be switched as follows:
"SETTING" → "Setting: Ⓒ" (ex. "AUTO RUN ON")

④ Press either ▲ or ▼ button.
A list of "Settings: Ⓒ" will be displayed one by one. Select your desired setting.

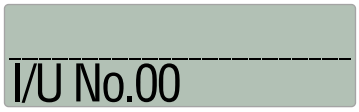
⑤ Press the SET button.
The selected setting is displayed for 2 seconds, then followed by "SET COMPLETE" and the function setting process is completed.
Then the screen display will be swiched to "Function number: Ⓐ, Function description: Ⓑ," so if you want to continue to set another function, repeat the steps as explained above.
To finish the function setting process, please proceed to Step (c).

* When "02 AUTO RUN SET " is selected.



When "I/U FUNCTION ▲" is selected.

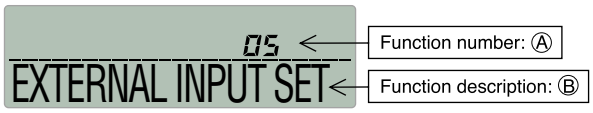
① The screen display will be switched as follows:
"◆☝ I/U SELECT" → "○☝ SET" → "I/U No.00" (blinking)



② Press either ▲ or ▼ button.
Select the indoor unit number that you want to change settings. If only one indoor unit is connected, the indoor unit number will not charge, so please proceed to Step ③.
If "ALL I/U ▼ " is selected while indoor group control is in effect, you can set all units to the same settings.

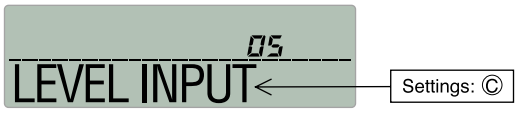
③ Press the SET button.
Indoor unit number indication will change from blinking to lit continuously, The screen display will be switched as follows:
"DATA LOADING" (blinking for about 2 to 23 seconds) → "◆☝ FUNCTION" → "05 EXTERNAL INPUT SET"
(Function number: Ⓐ, Function description: Ⓑ)

* When "05 EXTERNAL INPUT SET" is selected.



④ Press either ▲ or ▼ button.
"Function number: Ⓐ, Function description: Ⓑ" from the list of indoor unit functions will be displayed one by one. Select a desired function.

⑤ Press the SET button.
The screen display will be switched as follows: "◆☝ SETTING" → "Setting: Ⓒ" (ex. "LEVEL INPUT")



⑥ Press either ▲ or ▼ button.
A list "Setting: Ⓒ" will be displayed one by one. Select your desired setting.

⑦ Press the SET button.
The selected setting is displayed for 2 seconds, then followed by "SET COMPLETE" and the function setting process is completed.
Then the screen display will be switched to "Function number: Ⓐ, Function description: Ⓑ" so if you want to continue to set another function, repeat the stepa as explained above. To finish the function setting process, please proceed to Step 8.

⑧ Press AIR CON No. button.
The screen display will go back to the indoor unit selection screen (ex. " I/U No.00").

(c) Press the ON/OFF button.
This ends a function setting process. Even if a function setting process is not completed, this ends the process.
Please note that any setting that is not completed will become void.

- **Pressing the RESET button during a function setting process will allow you to go back the previous step. Please note that any setting that is not completed will become void.**
- **Method of checking the current setting**
  While following the above mentioned step, the setting that appears when the SET button is pressed for each "Function number: Ⓐ, Function description: Ⓑ" is the current setting "Stting: Ⓒ". (When "ALL I/U ▼" is selected, the setting of the indoor unit with the lowest number is displayed)
- **Settings are stored in the controller and not lost even a power outage occurs.**

(d) Changing the remote control's temperature setting range

1) The temperature setting range of the remote control can be changed.
   Through remote control button operations, the upper limit and lower limit set temperature values can be changed individually.
   During heating operation, the changed upper limit value becomes valid and at times other than during heating operation, (during cooling, dehumidification, auto and fan operation), the changed lower limit value becomes valid.
   Range of Possible Changes
   Upper Limit Value: 22~30°C (valid during heating) Lower Limit Value: 18 ~ 26°C (valid at times other than during heating)
2) Operation
   a) With the remote control in the stopped state, press the SET and MODE buttons simultaneously for 3 seconds or longer. The display will changed from " SELECT ITEM" → " SET" → "FUNCTION SET ▼ "
   b) Press the ▼ button once. The display will change to TEMP RANGE ▲ .
   c) Press the SET button to enter the temperature range setting mode.
   d) Using the ▲ or ▼ button, select "Hi LIMIT SET ▼ " or "Lo LIMIT SET ▲ ," the press the SET button.
   e) If "Hi LIMIT SET" is selected,
      ① The display changes from " SET UP" → "Hi LIMIT 22ºC " (flashing).
      ② Using the " " button, select the upper limit value. Display example: "Hi LIMIT 22°C " (flashing)
      ③ Press the SET button to fix the setting. Display example: "Hi LIMIT 22°C" (lighted up)
   f) If "Lo LIMIT SET" is selected,
      ① The display changes from " SET UP" → "Lo LIMIT 26°C " (flashing).
      ② Using the " " button, select the upper limit value. Display example: "Lo LIMIT 26°C " (flashing)
      ③ Press the SET button to fix the setting. Display example: "Lo LIMIT 26°C" (lighted up)
   g) Press the ON/OFF button to end the setting procedure.
      (The procedure also ends if the ON/OFF button is pressed during the setting operation. However, settings which have not been fixed become invalid, so exercise caution.)

- If the RESET button is pressed during a setting operation, the display returns to the previously displayed setting screen. However, settings which have not been fixed become invalid, so exercise caution.
  * If "NO DISP CHANGE" is selected in No. 12, "TEMP RANGE SET" of the remote control's functions, of the function setting modes, the remote control's display does not change even if the temperature range has been changed.

(Example) If the upper limit is set at 28˚C

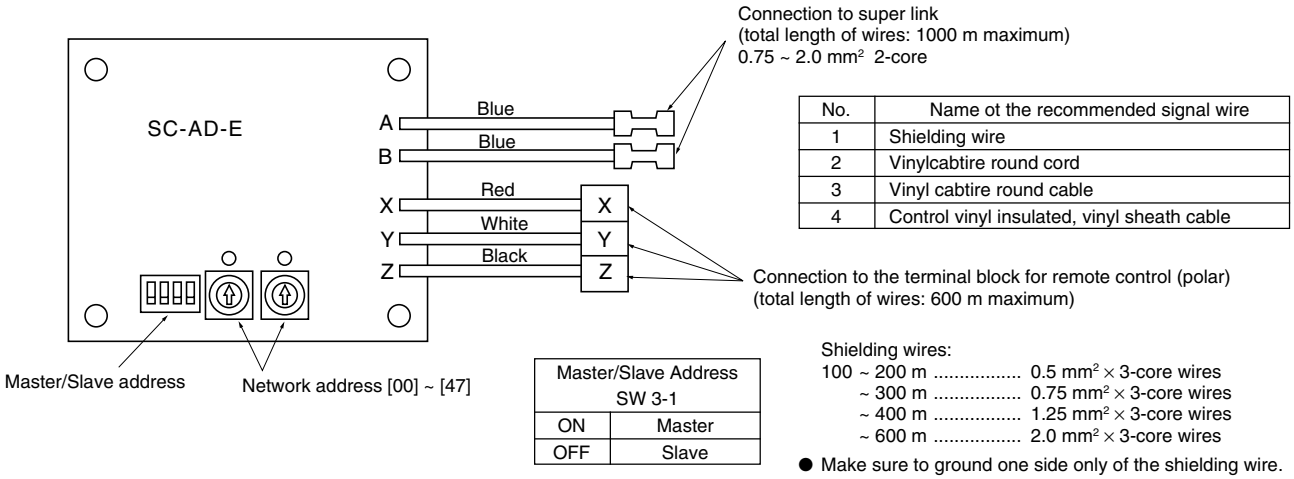
Function No. A	Function Contents B	Setting Contents C	Control Contents
12	TEMP RANGE SET	DISP CHANGE	The remote control's display and sent data upper limit changes to 28°C.
		NO DISP CHANGE	The remote control's display upper limit remains at 30ºC and only the upper limit of the sent data is changed to 28°C.

(4) SUPER LINK ADAPTER (SC-AD-E)

(a) Functions

1) Transmits the settings from the Super link option to the indoor units.
2) Returns the priority indoor unit data in response to a data request from the Super link option.
3) Inspects the error status of connected indoor units and transmits the inspection codes to the Super link option.
4) A maximum of 16 units can be controlled (if in the same operation mode).

(b) Wiring connection diagram



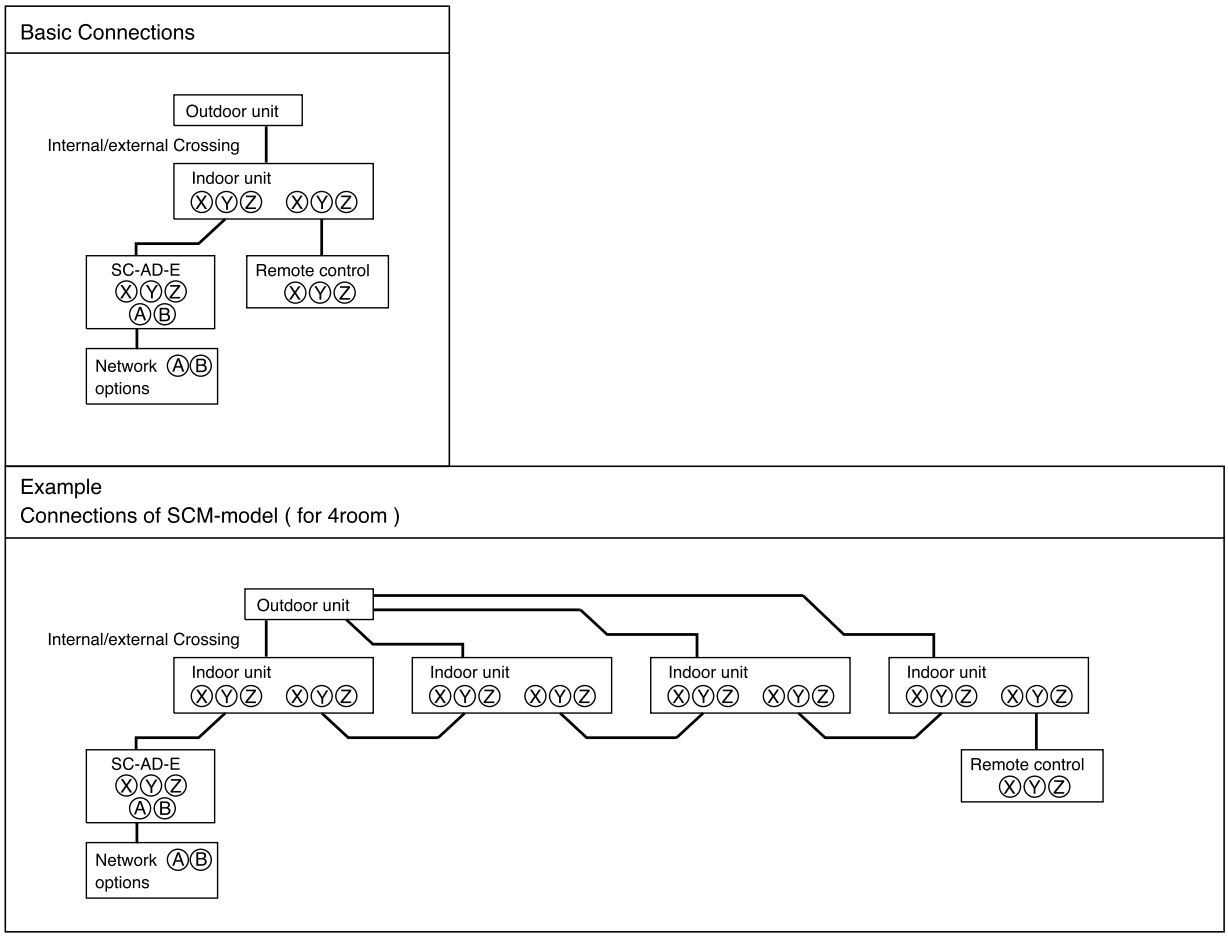
No.	Name ot the recommended signal wire
1	Shielding wire
2	Vinylcabtire round cord
3	Vinyl cabtire round cable
4	Control vinyl insulated, vinyl sheath cable

Master/Slave Address SW 3-1	
ON	Master
OFF	Slave

Shielding wires:
100 ~ 200 m ..... 0.5 mm² × 3-core wires
~ 300 m ..... 0.75 mm² × 3-core wires
~ 400 m ..... 1.25 mm² × 3-core wires
~ 600 m ..... 2.0 mm² × 3-core wires

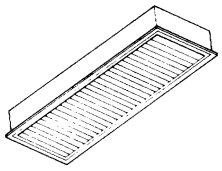
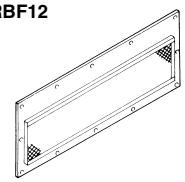
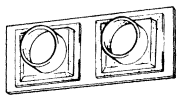
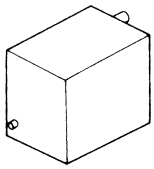
● Make sure to ground one side only of the shielding wire.

1) Set the super link network address with SW1 (10-position) and SW2 (1-position).
2) Without a remote control (no wired remote control and no wireless remote control), set SC-AD-E SW3-1 to ON (Master).



5.8 Installation of optional parts (Ducted type)

■ **Table of optional parts**

① Bottom air inlet grille set RTS12	② Rear inlet filter set RBF12	③ Duct joint for air outlet plate RFJ22	④ Drain up kit RDU12E
			

(1) Bottom air inlet grille set

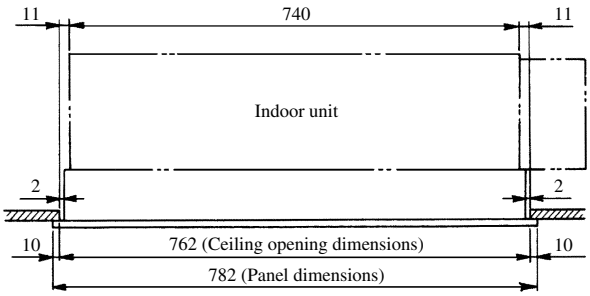
(a) Part No.: RTS12

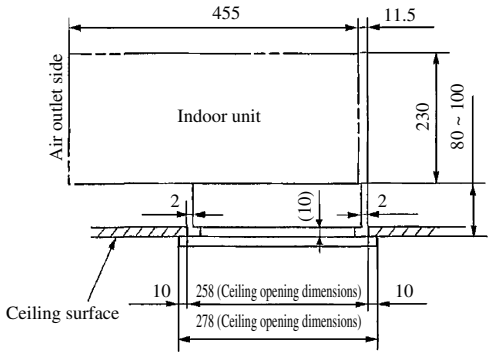
(b) Parts list

Name	Qty.
Air inlet grille	1
Duct for air inlet grille	1
Tapping screw	10
Pan-head screws	4

(c) Installation

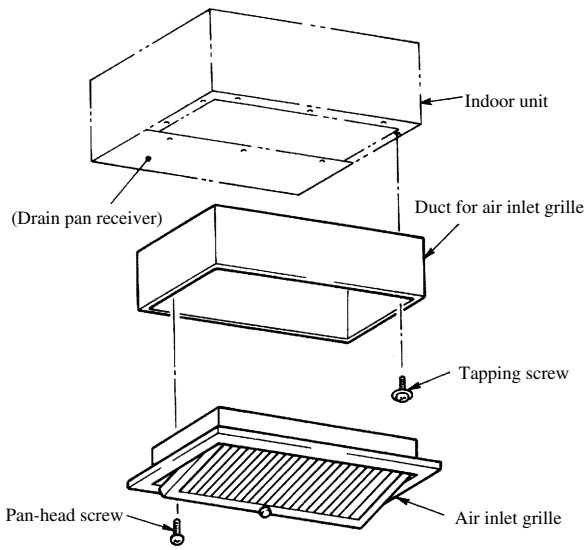
Unit: mm





(d) Installation procedure

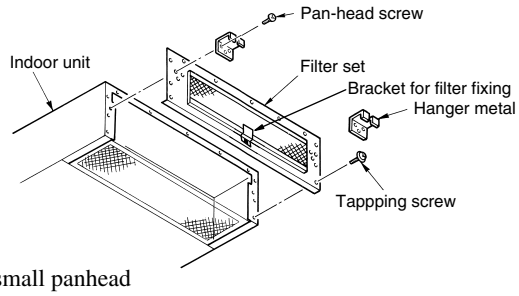
1) Mount the duct for the air inlet grille to the indoor unit using the 10 tapping screws provided. The tapping screws on the drain pan receiver side are also used for mounting the duct for the air inlet grille. They must first be removed and reinstalled after the duct for the air inlet grille is in place. A guideline for the height is to secure the assembly so that the lower surface of the duct for the intake grille is approximately 10 mm above the bottom surface of the ceiling.
2) Remove the center screw for the air inlet grille and open the grille as shown in the illustration. Next, insert the air inlet grille into the duct for the air inlet grille and secure it with the pan-head screws (the long screws).
3) Use the pan-head screws to make the small adjustments in height. The height dimension on the installation diagram allows for adjustment within range of 80 to 100 mm. If the pan-head screws are completely tightened, the height will be 80 mm.



(2) Rear inlet filter set

(a) Part No.: RBF12

(b) Installation



Do not use this filter set alone.

There are two inlet ports: lower inlet port (normal) and rear inlet port.

1) Detach the rear panel and the hanger metal screwad onto the rear panel from an indoor unit.

2) Attach the removed hanger metal to the frame of the filter set with small panhead screws. (One screw each on the right and left sides of the frame is designed to fasten them together onto the main unit).

3) Attach the filter set onto the point where the rear panel was attached with tapping screws. (The rear panel will become of no use anymore)

(3) Duct joint for air outlet plate

(a) Part No.: RFJ22

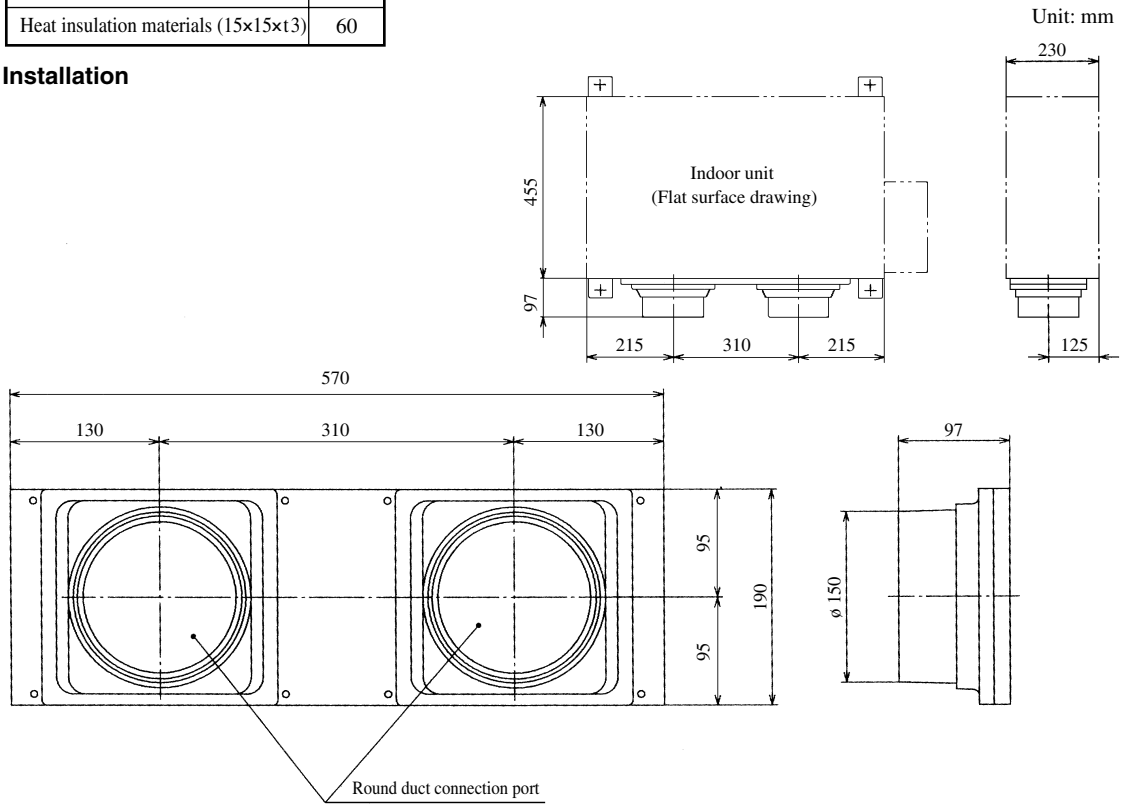
This duct joint is to be used for the connection of a round duct (ø 150 mm) to an indoor unit.

(b) Part list

Name	Qty.
Duct joint	1
Tapping screws	8
Heat insulation materials (15×15×t3)	60

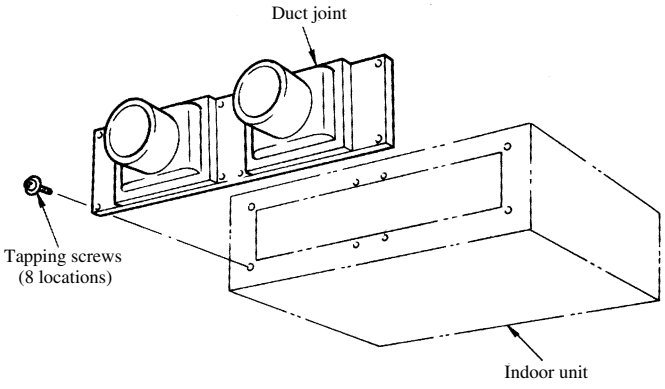
(c) Installation

Unit: mm

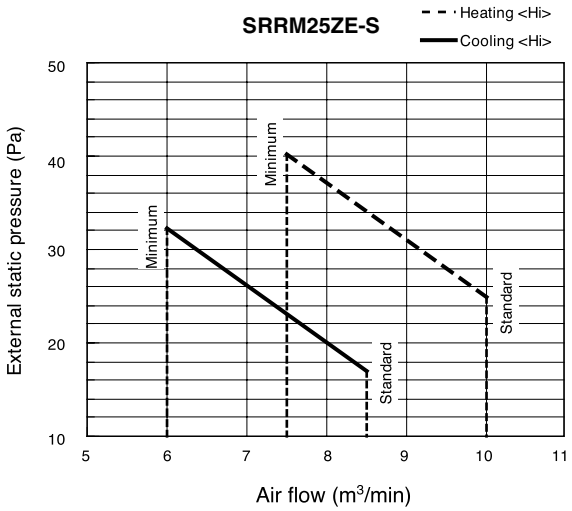


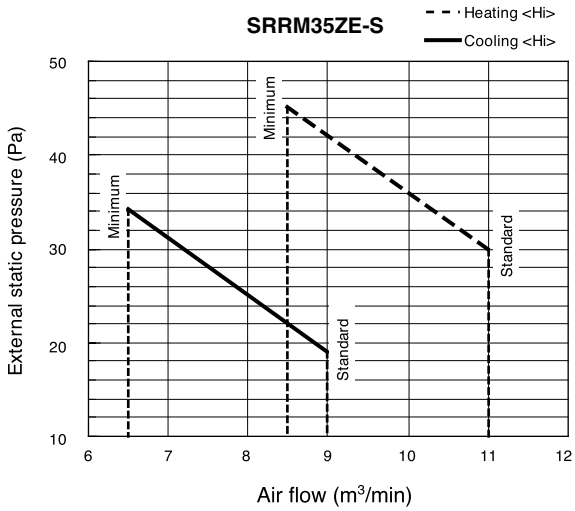
(d) Installation procedure

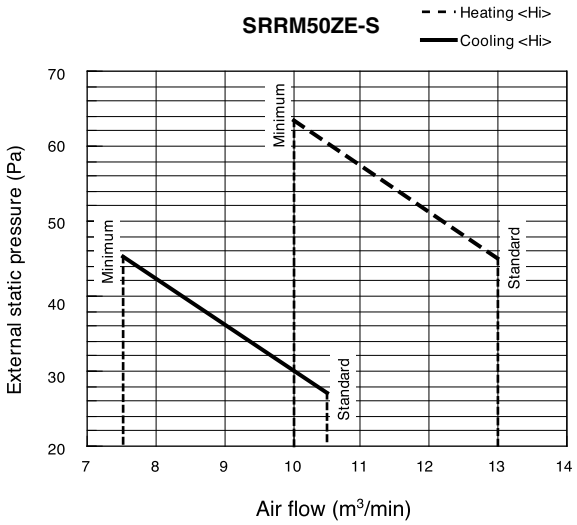
Use the tapping screws to mount the duct joint to the front of the indoor unit. Use care to prevent gaps from forming at the joining surfaces with the indoor unit. Use insulation at the connecting areas between a round duct and the duct joint to prevent condensation.

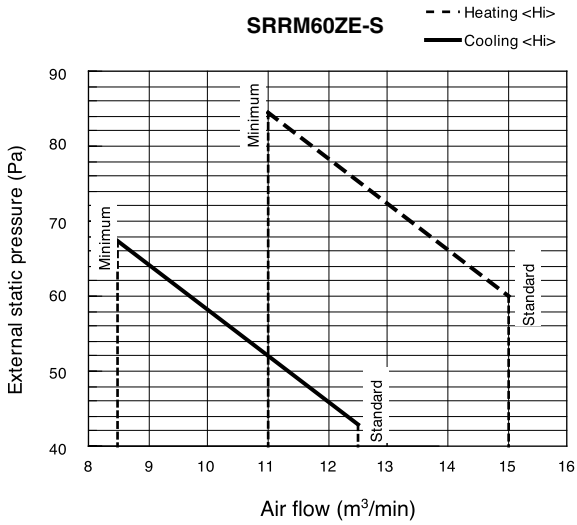


◆ **Air flow and external static pressure characteristics (Heating: Hi)**

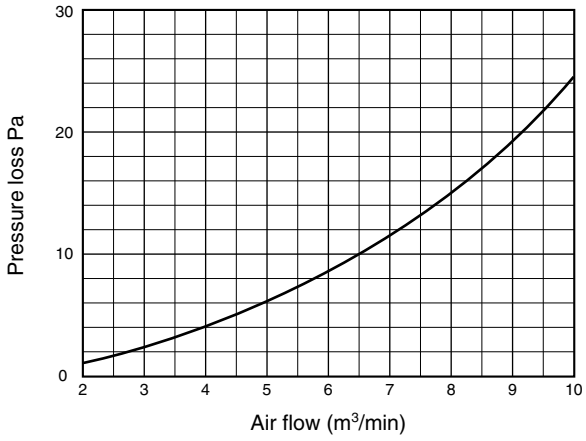








◆ **Air inlet grille air flow and friction loss characteristics (Part No.: RTS12)**



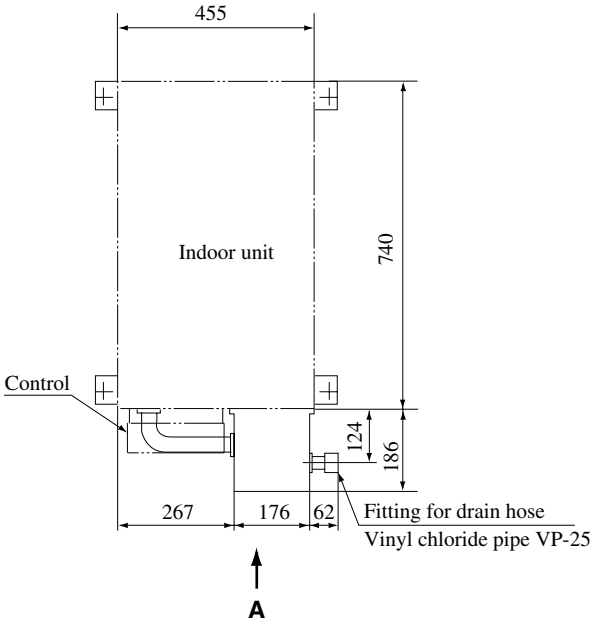
(4) Drain up kit

(a) Part No. : RDU12E

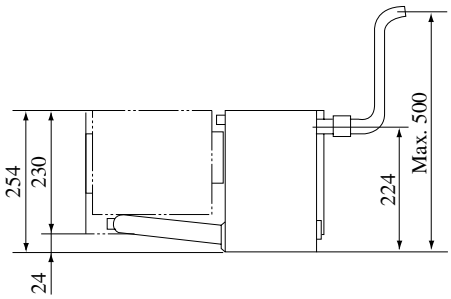
(b) Accessories

No.	Name	Qty.
①	Drain pump	1
②	Drain hose	1
③	Hose clamp	1
④	Tapping screw	4

(c) Installation of drain up kit



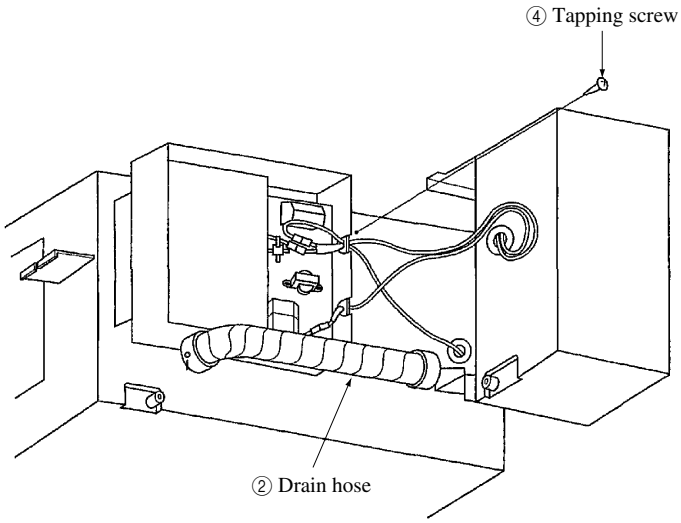
Unit: mm

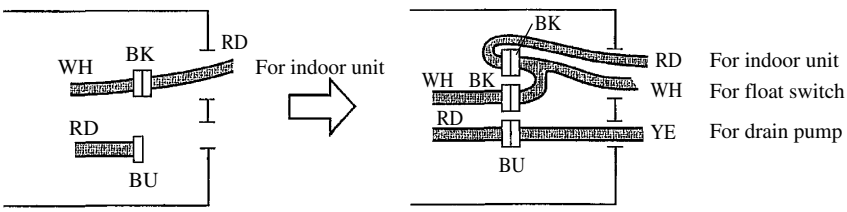


VIEW A

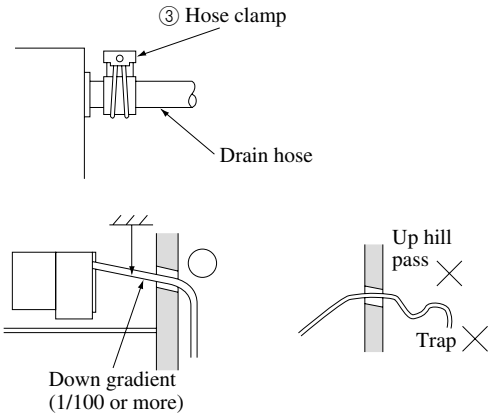
(d) Installation of drain up kit

1) Fix the drain up kit on the right side of the inside unit with tap screws.
2) Insert the drain hose fully and securely to the drain sockets of the inside unit and the drain up kit.
3) Connect the drain up kit's connectors for the drain pump (red color 2P) and the float switch (black 2P) to the connectors of the control box. (The control box's connectors for the drain pump and the float switch are also red and blace respectively.) Note that the control's connector for the float switch is already connected to the inside unit's connector for the float switch, so disconnect them and connect it to the drain up kit's connector for the float switch and fix it with the wire clamp.





4) Use hard PVC general purpose pipes VP-25 sold on the market for drain pipes after draining up.
5) Tighten the PVC pipe securely with the attached clamp after inserting it in the drain socket.
6) The drain pipe must have downward inclination gradient of 1/100 or more, and take care not to make a trap or uphill pass.
7) When connecting the drain pipe, take care not to apply force on the pipe of the unit, and clamp the pipe as close as possible to the unit.
8) Don't attach air purge pipe, because the drain might spout.
9) Be sure to provide heat insulation to the indoor side drain pipe.

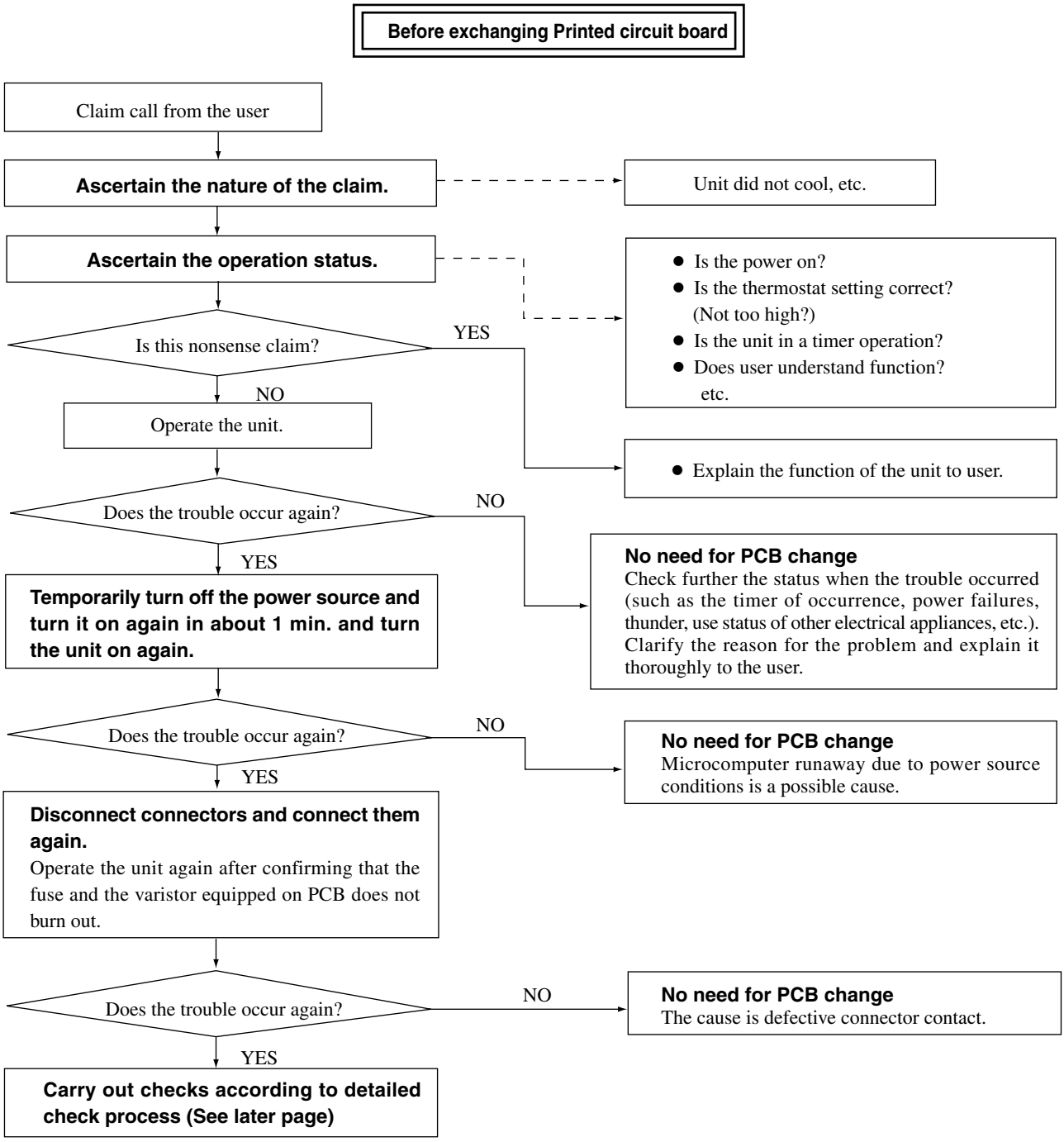


6 MAINTENANCE DATA

6.1 Trouble shooting

(1) Trouble shooting to be performed prior to exchanging PCB, (Printed circuit board) [Common to all models]

All the models described in this chapter are controlled by a microcomputer. When providing maintenance service to customers it is necessary to understand the function controlled by a micro computer thoroughly, so as not to mistakenly identify correct operations as mis-operations. It is also necessary to perform the following simple checks before conducting detailed checks or exchanging printed circuit board.


Before exchanging Printed circuit board
Claim call from the user
Ascertain the nature of the claim.
Unit did not cool, etc.
Ascertain the operation status.
● Is the power on?
● Is the thermostat setting correct? (Not too high?)
● Is the unit in a timer operation?
● Does user understand function? etc.
Is this nonsense claim?
YES
NO
Operate the unit.
● Explain the function of the unit to user.
Does the trouble occur again?
NO
YES
No need for PCB change
Check further the status when the trouble occurred (such as the timer of occurrence, power failures, thunder, use status of other electrical appliances, etc.). Clarify the reason for the problem and explain it thoroughly to the user.
Temporarily turn off the power source and turn it on again in about 1 min. and turn the unit on again.
Does the trouble occur again?
NO
YES
No need for PCB change
Microcomputer runaway due to power source conditions is a possible cause.
Disconnect connectors and connect them again.
Operate the unit again after confirming that the fuse and the varistor equipped on PCB does not burn out.
Does the trouble occur again?
NO
No need for PCB change
The cause is defective connector contact.
YES
Carry out checks according to detailed check process (See later page)

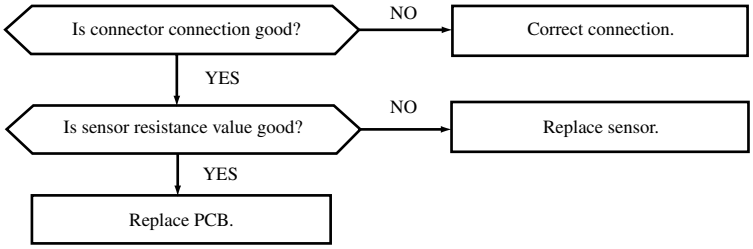
(2) Indication of self diagnosis

Indoor unit indicator		Outdoor unit indicator (LED 5)	Wired remote control display (optional parts)	Description of trouble	Cause	Conditions of flashing
RUN light	TIMER light					
1 time flash	Comes on	Stays off	E6	Indoor heat exchanger sensor (1) error	• Broken heat exchanger sensor (1) wire • Connector poor connection • Disconnected sensor	When heat exchanger sensor (1) temperature of –20°C or under continued for more than 15 seconds while operation is stopped. (This is not displayed during operation.)
2 time flash	Comes on	Stays off	E7	Room temperature sensor error	• Broken room temperature sensor wire • Connector poor connection	When room temperature sensor temperature of –20°C or under continued for more than 15 seconds while operation is stopped. (This is not displayed during operation.)
4 time flash	Comes on	Stays off	E9	Drain abnormality (STM, SRRM only)	• Drain at reverse gradient • Float switch defective	Float switch motion
5 time flash	Comes on	Stays off	E6	Indoor heat exchange sensor (2) error	• Broken heat exchanger sensor (2) wire • Connector poor connection • Disconnected sensor	When heat exchanger sensor (2) temperature of –20°C or under continued for more than 15 seconds while operation is stopped. (This is not displayed during operation.)
6 time flash	Comes on	Stays off	E16	Indoor fan motor error	• Defective fan motor • Connector poor connection	When air conditioner is operating and indoor fan motor is turned ON, indoor fan motor speed of 300 rpm or under continued for more than 30 seconds. (Air conditioner stops.)
7 time flash	Comes on	Stays off	E6	Closed service valve Indoor heat exchanger sensor (1) error	• Closed service valve • Heat exchanger sensor (1) is disconnected.	After cooling starts, when the temperature difference at the indoor heat exchanger sensor (1) after 13 minutes and after 16 minutes is greater than –2ºC, operation is stopped.
Keeps flashing	1 time flash	Stays off	E38	Outdoor air temperature sensor error	• Broken outdoor air temperature sensor wire • Poor connector connection	When outdoor air temperature sensor temperature of –20°C or under continued for more than 10 seconds while operation is stopped. (This is not displayed during operation.)
Keeps flashing	2 time flash	Stays off	E37	Outdoor heat exchanger sensor error	• Broken heat exchanger sensor wire • Poor connector connection	When heat exchanger sensor temperature of –20 °C or under continued for more than 10 seconds while operation is stopped. (This is not displayed during operation.)
Keep flashing	4 time flash	On for 4 seconds and off for 4 seconds	E39	Discharge pipe sensor error	• Broken discharge pipe sensor wire • Connector poor connection	After the decision speed has been 0 rps or more for 9 continuous minutes and the discharge pipe sensor has sent a 10 second or more broken wire signal. (Compressor is stopped.)
Keep flashing	5 time flash	Stays off	E53	Comp. suction sensor error	• Broken comp. suction sensor wire • Poor connector connection	When comp. suction sensor temperature of –20°C or under continued for more than 10 seconds while operation is stopped.
Comes on	1 time flash	1 time flash	E42	Current cut	• Compressor locking • Open phase on compressor output • Shortcircuit on power transistor	When converter output current which exceeds setting value is detected. (Compressor stops.)
Comes on	2 time flash	2 time flash	E59	Trouble of outdoor unit	• Defective power transistor. • Broken compressor wire • Compressor blockage	When an error with the outdoor unit causes an error stop, or when the input current is measured at 1 A or less for 3 continuous minutes or more. (Compressor is stopped.)
Comes on	3 time flash	3 time flash	E58	Current safe stop	• Overload operation • Overcharge	When the decision speed is 30 rps or less and the current save has operated. (Compressor stops)
Comes on	5 time flash	5 time flash	E36	Over heat of compressor	• Gas shortage • Defective discharge pipe sensor	When discharge pipe sensor value exceeds setting value. (Compressor Stops.)
Comes on	6 time flash	6 time flash	E5	Error of signal transmission	• Defective power supply • Broken signal wire • Defective indoor/outdoor unit circuit boads.	If serial signal cannot be sent or received for 1 minute and 55 seconds continuously.
2 time flash	2 time flash	7 time flash	E60	Compressor lock	• Defective compressor • Defective outdoor PCB	When the motor for the compressor does not turn 1/12 revolution 0.044 second after it has been started.
—	—	—	E1	Error of wired remote control wiring	• Broken wired remote control wire • Defective indoor unit boards	The wired remote control wire Y is open. The wired remote control wires X and Y are reversely connected. Noise is penetrating the wired remote control lines. The wired remote control or indoor control PCB is faulty. (The communications circuit is faulty.)

(3) Inspection procedures corresponding to detail of trouble

Sensor error

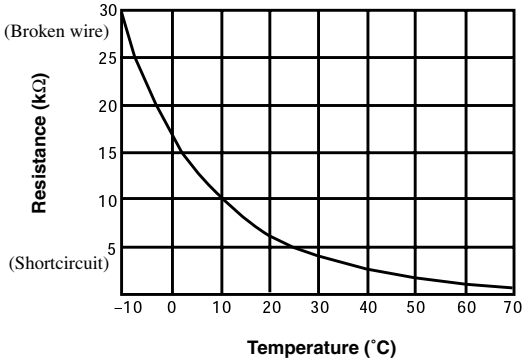
[Broken sensor wire, connector poor connection]



◆ **Discharge pipe sensor temperature characteristics**

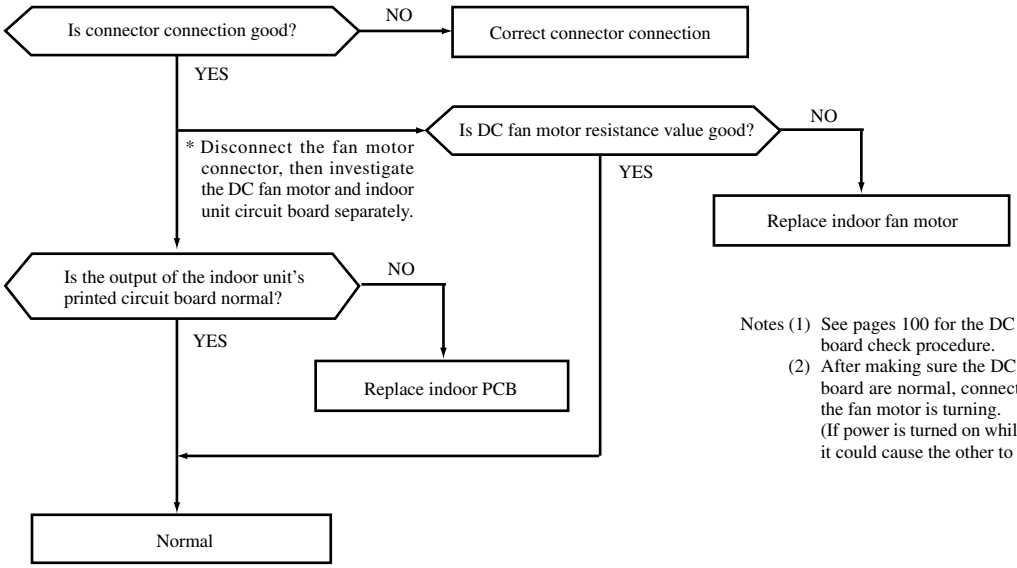
Temperature (˚C)	Resistance (kΩ)	Temperature (˚C)	Resistance (kΩ)
0	164	70	8.7
5	127	75	7.3
10	99	80	6.2
15	78	85	5.3
20	62	90	4.5
25	50	95	3.9
30	40	100	3.3
35	32	105	2.9
40	26	110	2.5
45	21	115	2.2
50	17	120	1.9
55	14	125	1.6
60	12	130	1.4
65	10	135	1.3

◆ **Sensor temperature characteristics (Room temp., indoor unit heat exchanger temp., outdoor unit heat exchanger temp., outdoor air temp.)**



Indoor fan motor error

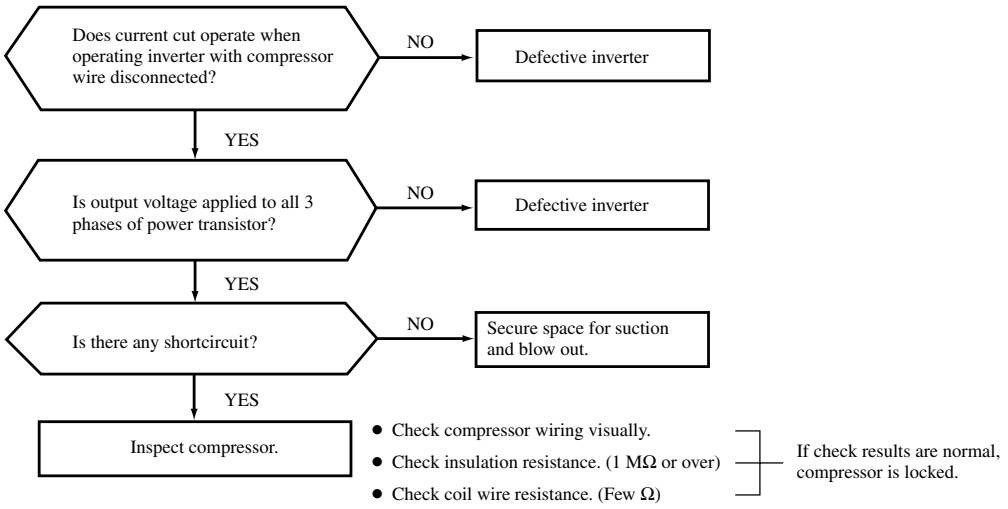
[Defective fan motor, connector poor connection, defective PCB]


Is connector connection good?
NO
Correct connector connection
YES
* Disconnect the fan motor connector, then investigate the DC fan motor and indoor unit circuit board separately.
Is DC fan motor resistance value good?
NO
YES
Replace indoor fan motor
Is the output of the indoor unit's printed circuit board normal?
NO
YES
Replace indoor PCB
Normal

Notes (1) See pages 100 for the DC fan motor and indoor unit circuit board check procedure.
(2) After making sure the DC fan motor and indoor unit circuit board are normal, connect the connectors and confirm that the fan motor is turning.
(If power is turned on while one or the other is broken down, it could cause the other to break down also.)

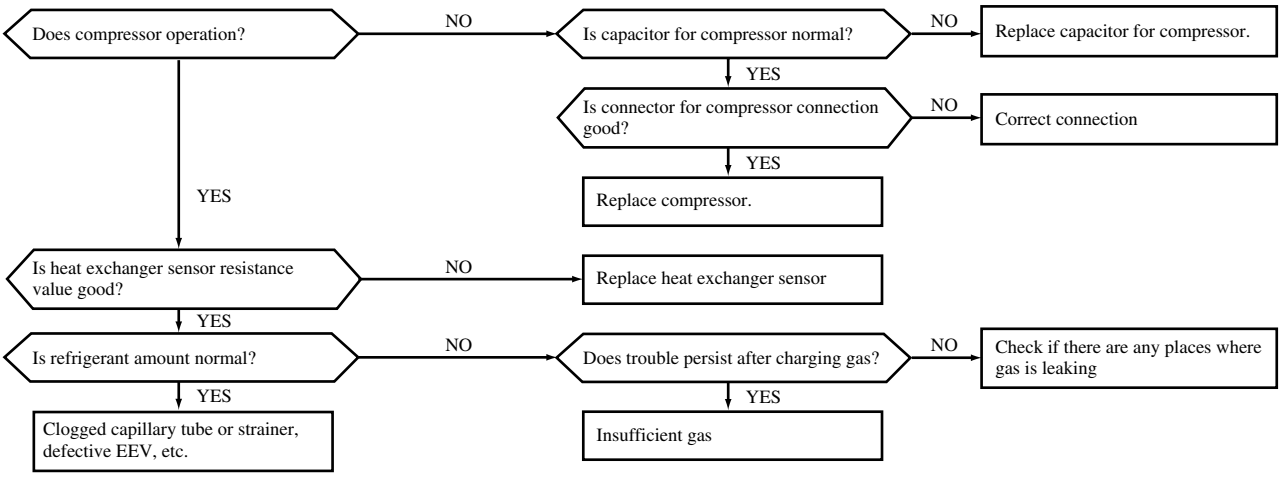
Current cut

[Open phase on compressor output terminal, compressor lock]


Does current cut operate when operating inverter with compressor wire disconnected?
NO
Defective inverter
YES
Is output voltage applied to all 3 phases of power transistor?
NO
Defective inverter
YES
Is there any shortcircuit?
NO
Secure space for suction and blow out.
YES
Inspect compressor.
● Check compressor wiring visually.
● Check insulation resistance. (1 MΩ or over)
● Check coil wire resistance. (Few Ω)
If check results are normal, compressor is locked.

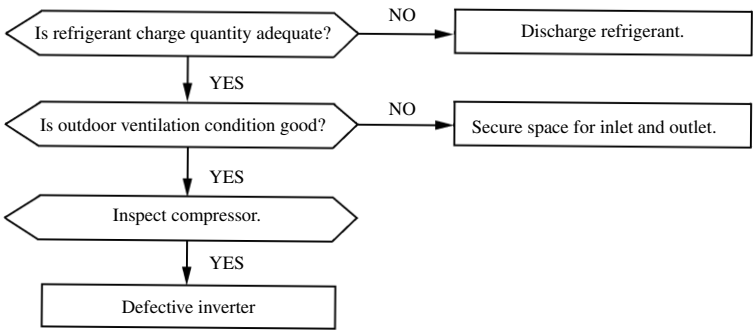
Abnormality of outdoor unit

[Compressor malfunction of insufficient gas (refrigerant)]



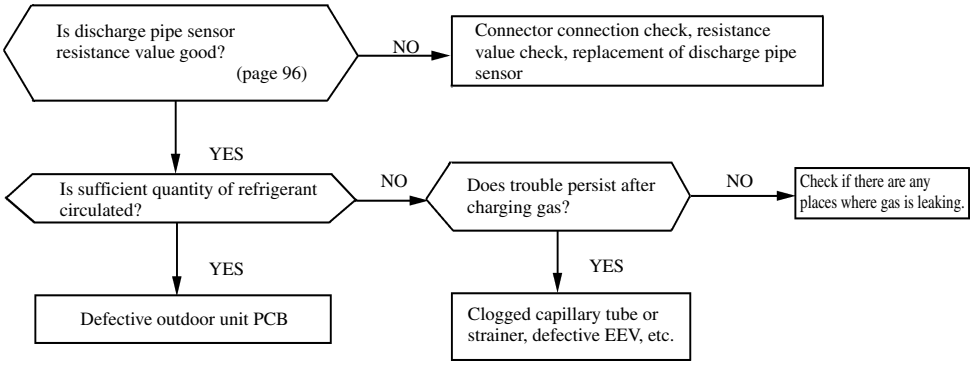
Current safe stop

[Overload operation, compressor lock, overcharge]



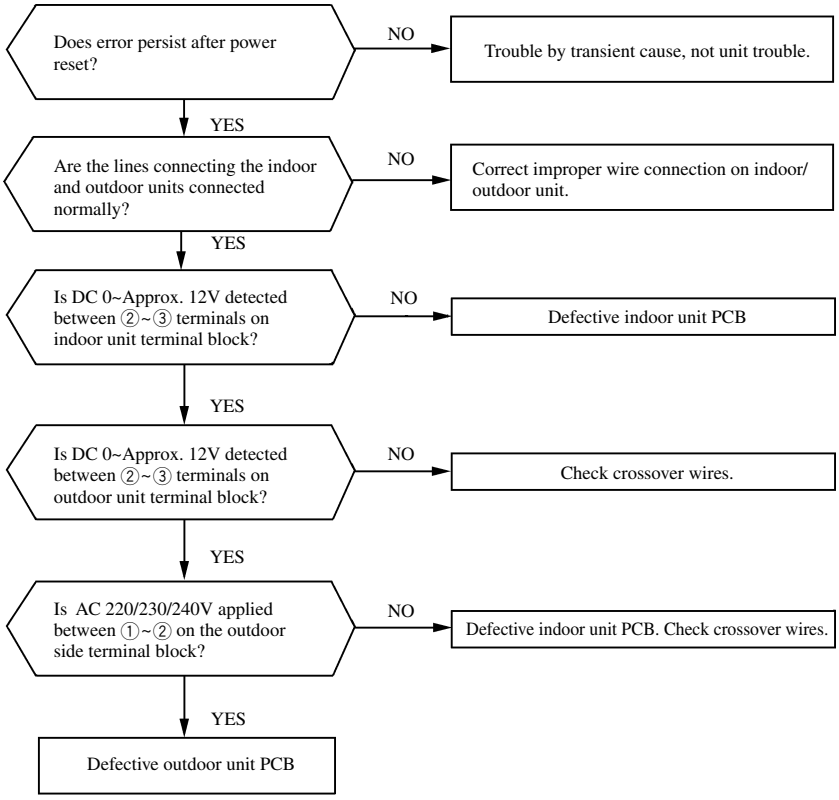
Over heat of compressor

[Gas shortage, defective discharge pipe sensor]


Is discharge pipe sensor resistance value good? (page 96)
NO
Connector connection check, resistance value check, replacement of discharge pipe sensor
YES
Is sufficient quantity of refrigerant circulated?
NO
Does trouble persist after charging gas?
NO
Check if there are any places where gas is leaking.
YES
YES
Defective outdoor unit PCB
Clogged capillary tube or strainer, defective EEV, etc.

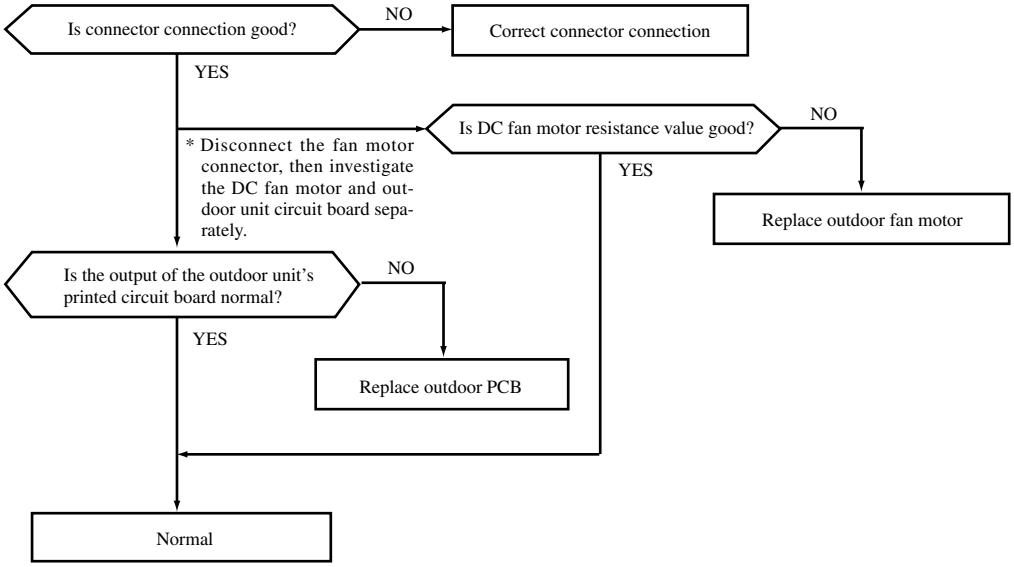
Error of signal transmission

[Wiring error including power cable, defective indoor/ outdoor unit PCB]


Does error persist after power reset?
NO
Trouble by transient cause, not unit trouble.
YES
Are the lines connecting the indoor and outdoor units connected normally?
NO
Correct improper wire connection on indoor/ outdoor unit.
YES
Is DC 0~Approx. 12V detected between ②~③ terminals on indoor unit terminal block?
NO
Defective indoor unit PCB
YES
Is DC 0~Approx. 12V detected between ②~③ terminals on outdoor unit terminal block?
NO
Check crossover wires.
YES
Is AC 220/230/240V applied between ①~② on the outdoor side terminal block?
NO
Defective indoor unit PCB. Check crossover wires.
YES
Defective outdoor unit PCB

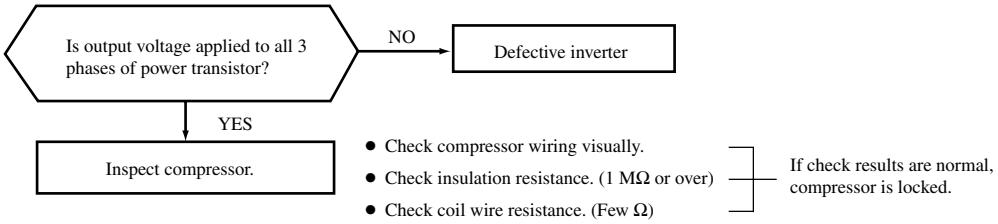
Outdoor fan motor error

[Defective fan motor, connector poor connection, defective PCB]


Is connector connection good?
NO
Correct connector connection
YES
* Disconnect the fan motor connector, then investigate the DC fan motor and outdoor unit circuit board separately.
Is DC fan motor resistance value good?
NO
YES
Replace outdoor fan motor
Is the output of the outdoor unit's printed circuit board normal?
NO
YES
Replace outdoor PCB
Normal

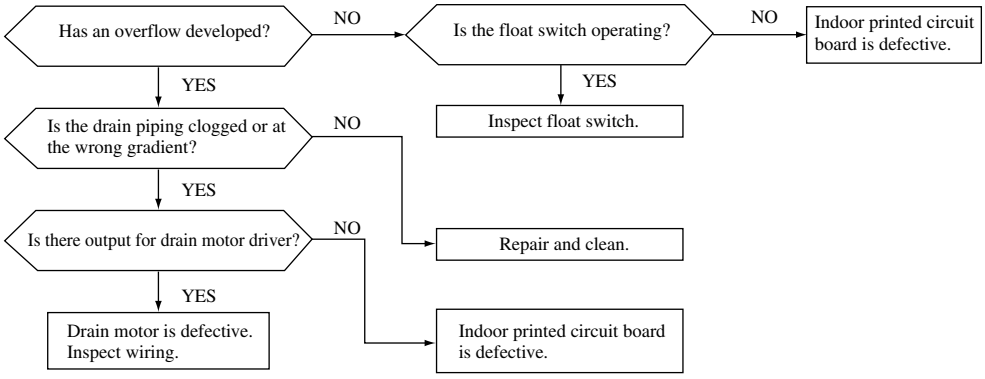
Rotor lock

[Compressor defect, outdoor unit circuit defect]


Is output voltage applied to all 3 phases of power transistor?
NO
Defective inverter
YES
Inspect compressor.
● Check compressor wiring visually.
● Check insulation resistance. (1 MΩ or over)
● Check coil wire resistance. (Few Ω)
If check results are normal, compressor is locked.

Drain abnormality (STM, SRRM only)

[Drain piping defective, pump defect]



(4) Phenomenon observed after shortcircuit, wire breakage on sensor

(a) Indoor unit

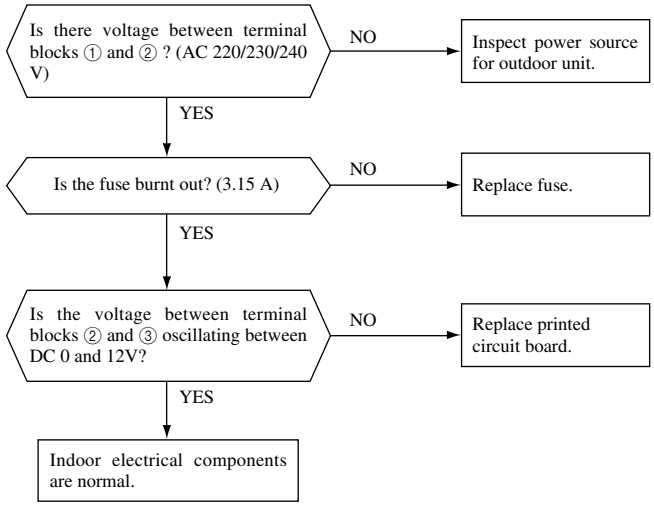
Sensor	Operation mode	Phenomenon	
		Shortcircuit	Broken wire
Room temperature sensor	Cooling	Release of continuous compressor operation command	Continuous compressor operation command is not released.
	Heating	Continuous compressor operation command is not released.	Release of continuous compressor operation command
Heat exchanger sensor	Cooling	Compressor stop. (Abnormality of outdoor unit)	Continuous compressor operation command is not released. (Anti-frosting)
	Heating	High pressure control mode	Hot keep (Indoor fan stop)

(b) Outdoor unit

Sensor	Operation mode	Phenomenon	
		Shortcircuit	Broken wire
Heat exchanger sensor	Cooling	System can be operated normally.	System can be operated normally.
	Heating	Defrosting is not performed.	Defrosting is performed for 10 minutes at approx. 45 minutes.
Outdoor air temperature sensor	Cooling	System can be operated normally.	System can be operated normally.
	Heating	Defrosting is not operated.	Defrosting is performed for 10 minutes at approx. 45 minutes.
Discharge pipe sensor	All modes	Compressor overload protection is disabled. (Can be operated.)	Compressor stop

(5) Checking the indoor electrical equipment

(a) Indoor unit circuit board check procedure


Is there voltage between terminal blocks ① and ② ? (AC 220/230/240 V)
NO
Inspect power source for outdoor unit.
YES
Is the fuse burnt out? (3.15 A)
NO
Replace fuse.
YES
Is the voltage between terminal blocks ② and ③ oscillating between DC 0 and 12V?
NO
Replace printed circuit board.
YES
Indoor electrical components are normal.

(b) Indoor unit fan motor check procedure

This is a diagnostic procedure for determining if the indoor unit's fan motor or the circuit board is broken down.

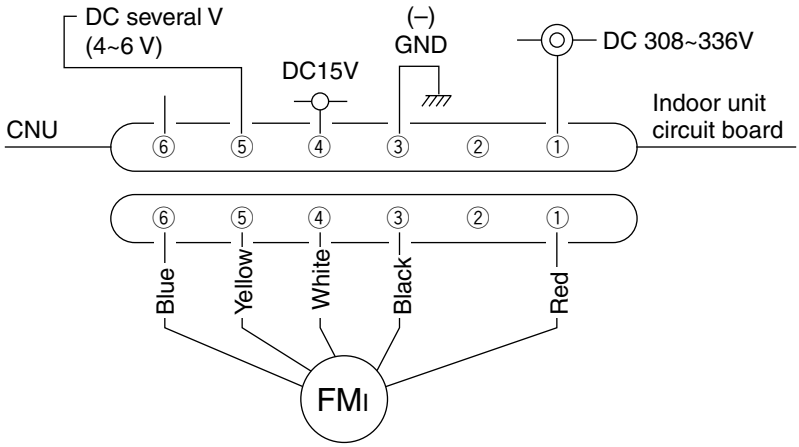
1) Indoor unit printed circuit board output check

a) Turn off the power.

b) Remove the front panel, then disconnect the fan motor lead wire connector.

c) Turn on the power. If the unit operates when the ON/OFF button is pressed, if trouble is detected after the voltages in the following figure are output for approximately 30 seconds, it means that the circuit board is normal and the fan motor is broken down.

If the voltages in the following figure are not output at connector pins No. ①, ④ and ⑤, the indoor unit's circuit board has failed and the fan motor is normal.

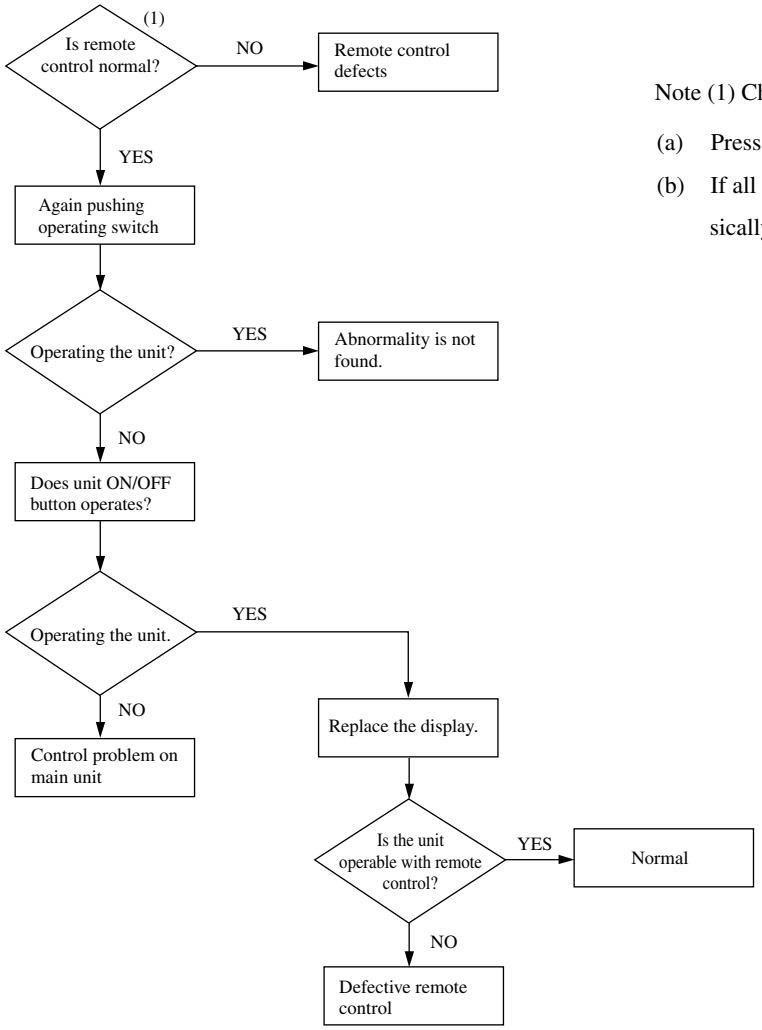


2) DC Fan motor resistance check

Measuring Point	Resistance when Normal
① – ③ (Red – Black)	25 MΩ or higher
④ – ③ (White – Black)	30 kΩ or higher

Notes (1) Remove the fan motor and measure it without power connected to it.
(2) If the measured value is below the value when the motor is normal, it means that the fan motor is faulty.

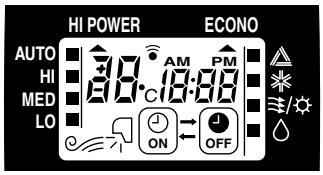
(6) How to make sure of remote control



Note (1) Check method of remote control

(a) Press the reset switch of the remote control.

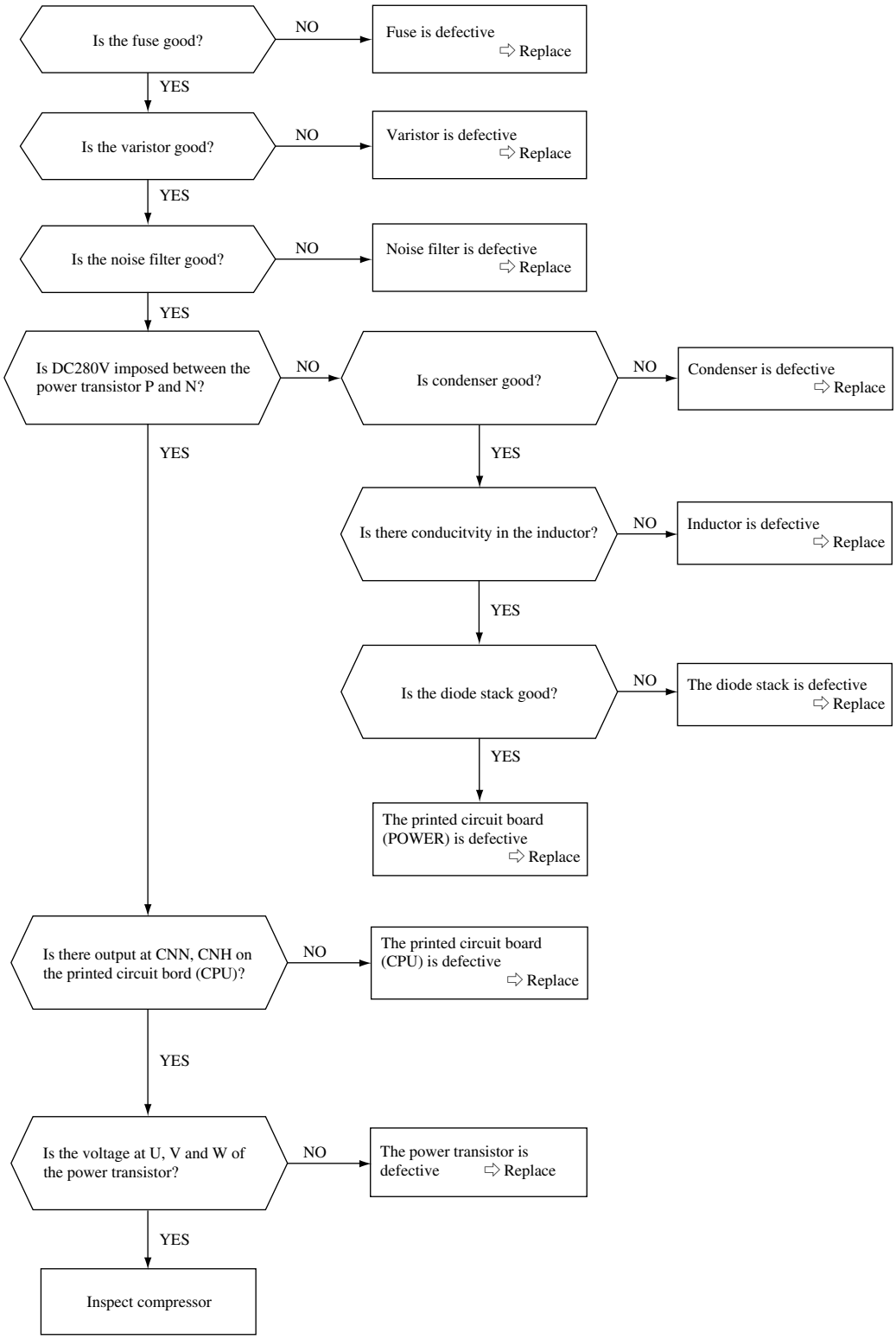
(b) If all LCD are displayed after zero (1) display, it is basically normal.



(7) Inverter failure diagnosis

If the results of the diagnosis in Item (3) indicate that the inverter is defective, perform the following inspection on the inverter.

(a) Diagnosis procedure

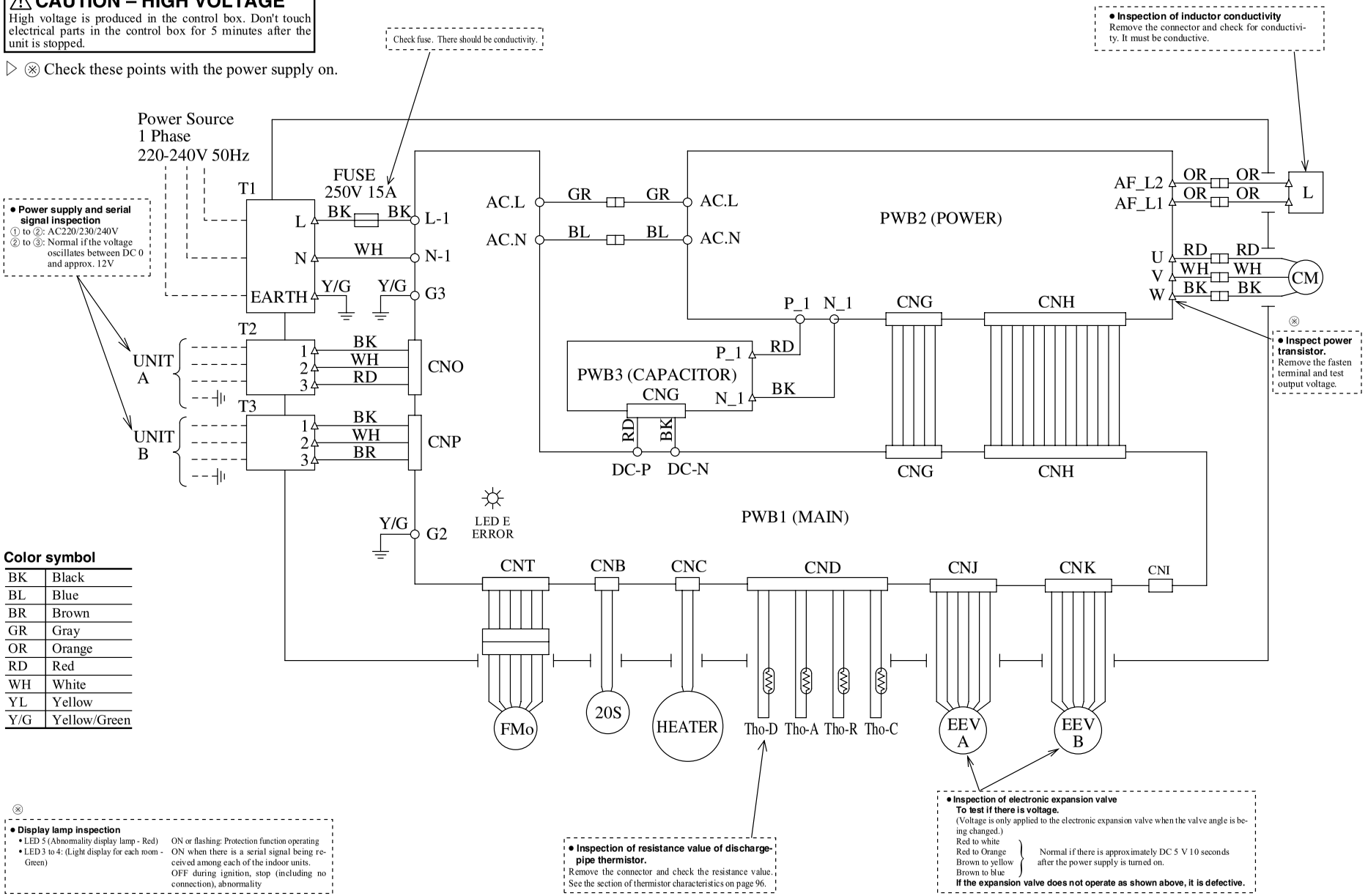


(b) Outdoor unit inspection points

◆SCM40ZF-S, 45ZF-S

⚠ CAUTION – HIGH VOLTAGE
High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unit is stopped.

▷ ⊗ Check these points with the power supply on.



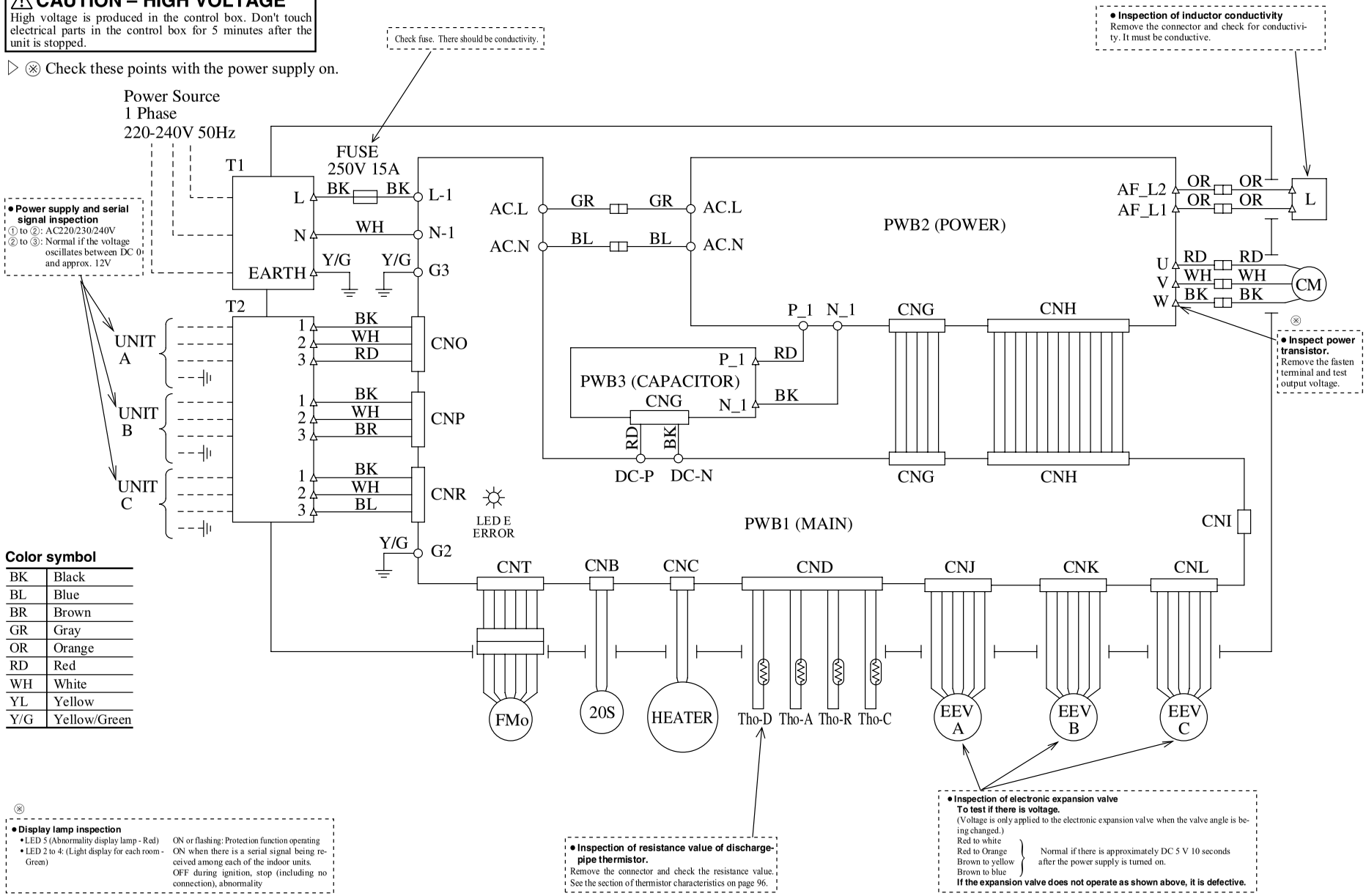
Color symbol

BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
YL	Yellow
Y/G	Yellow/Green

◆SCM48ZF-S

⚠ CAUTION – HIGH VOLTAGE
High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unit is stopped.

▷ ⊗ Check these points with the power supply on.



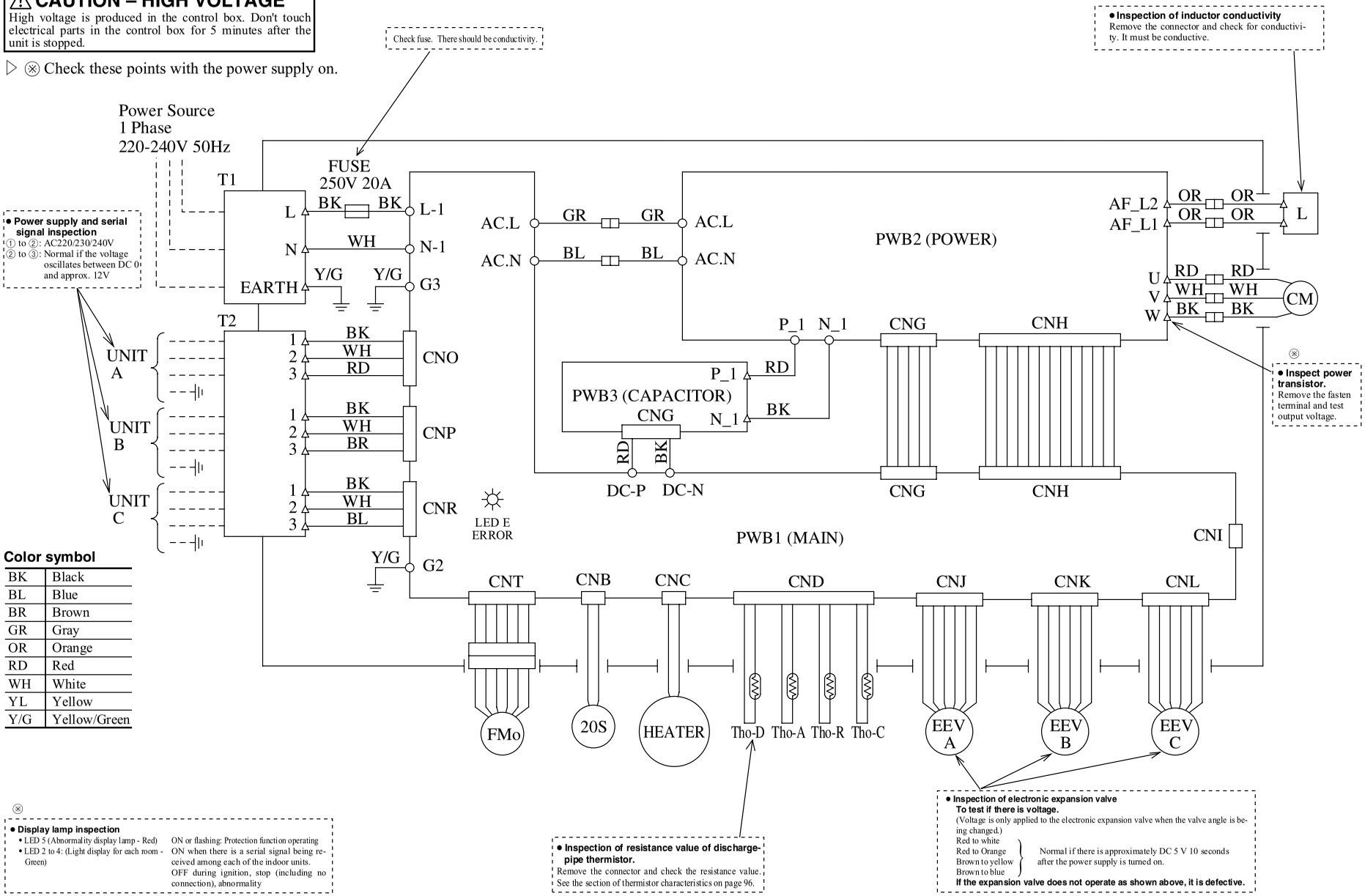
Color symbol

BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
YL	Yellow
Y/G	Yellow/Green

◆SCM60ZF-S

⚠ CAUTION – HIGH VOLTAGE
High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unit is stopped.

▷ ⊗ Check these points with the power supply on.



Color symbol

BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
YL	Yellow
Y/G	Yellow/Green

⊗

● Display lamp inspection

• LED 5 (Abnormality display lamp - Red)	ON or flashing: Protection function operating
• LED 2 to 4: (Light display for each room - Green)	ON when there is a serial signal being received among each of the indoor units. OFF during ignition, stop (including no connection), abnormality

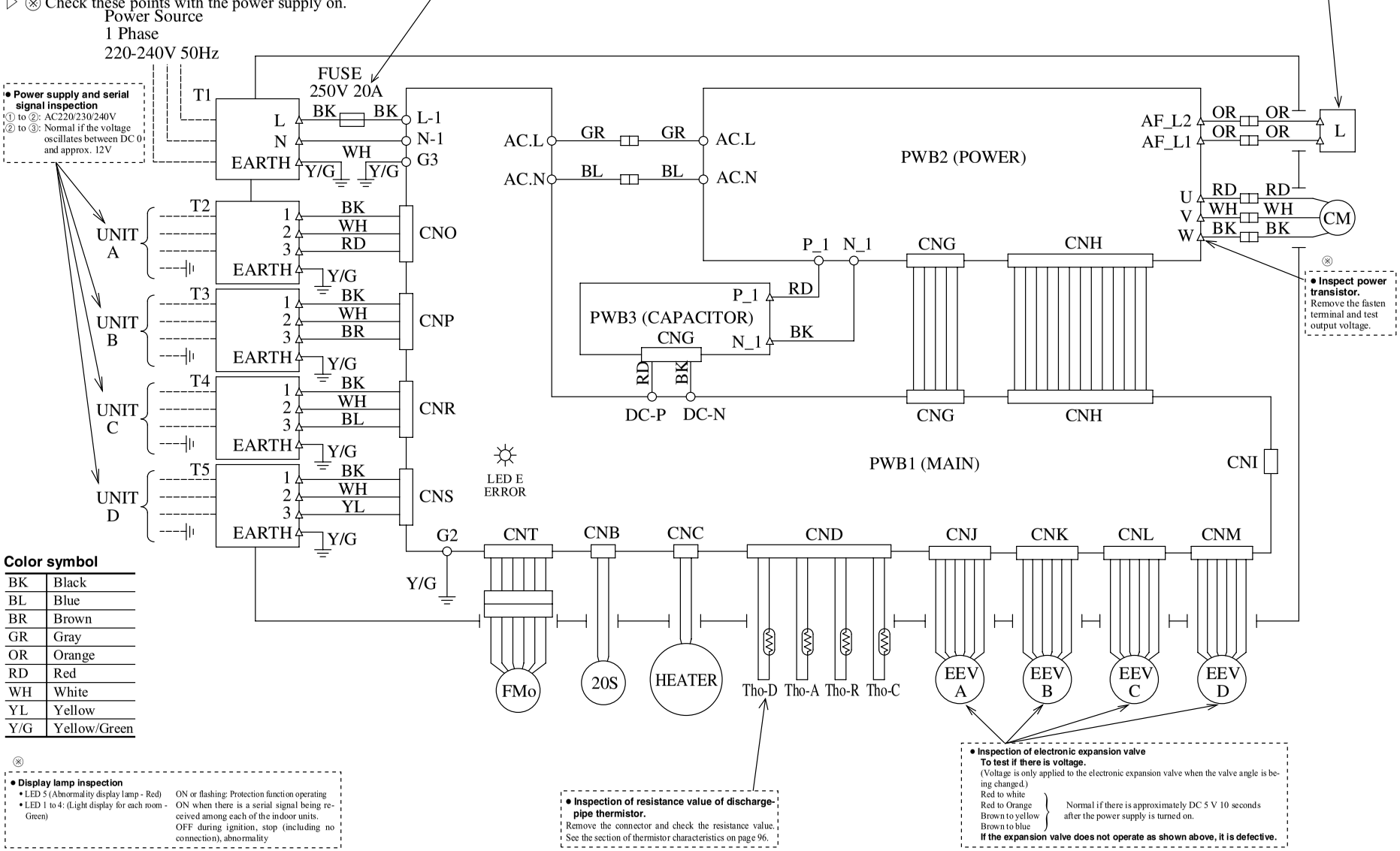
● Inspection of resistance value of discharge-pipe thermistor.
Remove the connector and check the resistance value.
See the section of thermistor characteristics on page 96.

● Inspection of electronic expansion valve
To test if there is voltage.
(Voltage is only applied to the electronic expansion valve when the valve angle is being changed.)
Red to white
Red to Orange
Brown to yellow
Brown to blue
} Normal if there is approximately DC 5 V 10 seconds after the power supply is turned on.
If the expansion valve does not operate as shown above, it is defective.

◆SCM80ZF-S

⚠ CAUTION – HIGH VOLTAGE
High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unit is stopped.

▷ ⊗ Check these points with the power supply on.



Color symbol

BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
YL	Yellow
Y/G	Yellow/Green

⊗
● Display lamp inspection
- LED 5 (Abnormality display lamp - Red) — ON or flashing: Protection function operating
- LED 1 to 4: (Light display for each room - Green) — ON when there is a serial signal being received among each of the indoor units. OFF during ignition, stop (including no connection), abnormality

● Inspection of resistance value of discharge-pipe thermistor.
Remove the connector and check the resistance value.
See the section of thermistor characteristics on page 96.

● Inspection of electronic expansion valve
To test if there is voltage.
(Voltage is only applied to the electronic expansion valve when the valve angle is being changed.)
Red to white
Red to Orange
Brown to yellow
Brown to blue
} Normal if there is approximately DC 5 V 10 seconds after the power supply is turned on.
If the expansion valve does not operate as shown above, it is defective.

◆ Power transistor inspection procedure

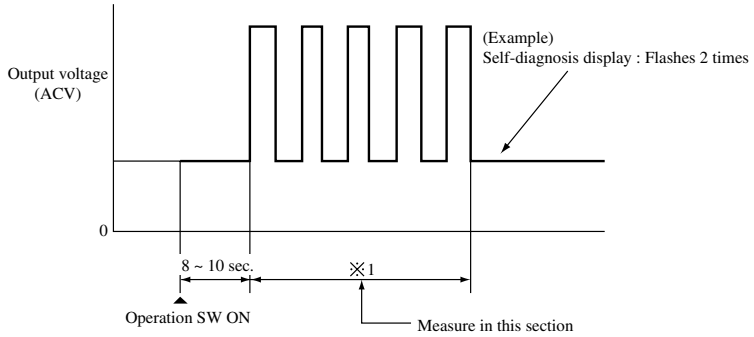
[Use a tester with a needle indicator for the inspection. (Do not use a digital tester. Check in the AC 300 volt range.)]

1) If there is a self-diagnosis display, inspect the compressor system (burns, wiring mistakes, etc.). If no problems are found, check the output of the power transistor.

2) Output inspection procedure

Disconnect the terminals for the compressor. If an output such as the one shown in the figure on the right can be measured, the power transistor and the circuit board for the outdoor unit are normal.

* For about 50 seconds. After being switched on, there will be a delay of approximately one minute depending on the conditions.



6.2 Servicing

(1) Evacuation

The evacuation is an procedure to purge impurities ..... noncondensable gas, air, moisture from the refrigerant equipment by using a vacuum pump. Since the refrigerant R410A is very insoluble in water, even a small amount of moisture left in the refrigerant equipment will freeze, causing what is called water clogging.

- Evacuation procedure

(a) Check to ensure that there is no internal pressure in the unit. If there is an internal pressure, it should be relieved through the check joint.

(b) Connect the service hoses of the gauge manifold to the check joint of the gas & liquid piping.

(c) Connect a vacuum pump to the charge hose Ⓐ. Repeat evacuation in the following sequence.

Start the vacuum pump.

⇩

Compound pressure gauge indicates –0.1 MPa (–76 cmHg)

⇩

Operate the vacuum pump for more than 15 minutes after –0.1 MPa (–76 cmHg) is indicated.

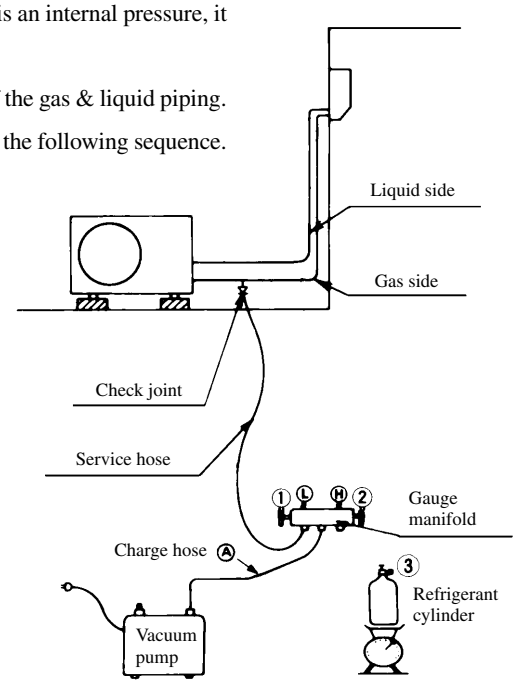
⇩

Close low pressure valve ① of gauge manifold.

⇩

Stop the vacuum pump.

Notes (1) Do not use the refrigerant pressure to expel air.
(2) Do not use the compressor for evacuation.
(3) Do not operate the compressor in the vacuum condition.



(2) Refrigerant charge

(a) Discharge refrigerant entirely from the unit and evacuate the unit.
Note: Addition of refrigerant without evacuation is unreasonable, because it will result in low charge or overcharge.

(b) Keep the gauge manifold and connect a refrigerant cylinder to the unit.

(c) Record the weight of the refrigerant cylinder on the balance. This is necessary for making sure of the charged refrigerant amount.

(d) Purge air from the charge hose Ⓐ
Firstly loose the connecting portion of the charge hose Ⓐ at the gauge manihold side and open the valve ③ for a few seconds, and then immediately retighten it after observing that gas is blow out from the loosened portion.

(e) Open the valve ① and ③ after discharging air from the charge hose Ⓐ, then the liquid refrigerant begins flowing from the cylinder into the unit. Be sure to erect the refrigerant cylinder upright to let liquid refrigerant flow into the unit.

(f) When refrigerant has been charged into the system to some extent, refrigerant flow becomes stagnant, when that happens, start the compressor in cooling cycle until the unit is filled with refrigerant to the specified weight.

(g) Making sure of the refrigerant amount, close the valve ③.

(h) Disconnect the charge hose from the unit. Cover the valve ports of the refrigerant piping with caps and tighten them securely.

(i) Check for gas leakage applying a gas leak detector along the piping line.

(j) Start the air conditioner and make sure of its operating condition ..... high side and low side pressures and temperature difference between suction air and outlet air.

7 REFRIGERANT PIPING INSTALLATION/SERVICING MANUAL FOR AIR CONDITIONERS USING R410A

(These materials are extracted from document issued by The Japan Refrigeration and Air Conditioning Industry Association)

7.1 Outline

7.1.1 Refrigerant R410A

(1) Adoption of R410A in air conditioners

In 1974, it was pointed out that the ozone layer in the upper stratosphere (about 20 ~ 40 km above ground) might have been damaged by the ozone depleting substances such as CFC (chlorofluorocarbon) and HCFC (hydrochlorofluorocarbon). Since that time, many countries across the world have endeavored to take countermeasures against the ozone depletion.

As a refrigerant belonging to the HCFCs, the conventional refrigerant (R22) used in air conditioners also tends to deplete the ozone layer. Therefore, complying with the provisions of the international regulations (i.e. Montreal Protocol concerning the Ozone Depleting Substances) and national laws & Regulations concerned, it is necessary to replace R22 with other types of refrigerant which do not deplete the ozone layer.

A refrigerant composed of hydrogen (H), fluorine (F) and carbon (C), is called an HFC and does not deplete the ozone layer. One HFC's is R410A whose pressure is about 1.6 times higher than R22 and whose energy efficiency is almost comparable to that of R22 at the same refrigerant temperature.

(2) Chemical characteristics of R410A

a) Chemical stability

Like R22, R410A is a chemically stable, less toxic and non-flammable refrigerant. However, as in the case of R22, the specific gravity of its vapour is larger than that of air and should it leak in an airtight room it may stay at a low level and cause an oxygen starvation accident. It may also, should it come in direct contact with fire, cause a poisonous gas to occur, so be sure to handle it only in a well ventilated area.

b) Composition changes (Pseudo-azeotropic characteristics)

R410A is a pseudo-azeotropic mixed refrigerant composed of two constituents - R32 and R125. "Quasi-azeotropic" condition refers to a state in which the dew-point curve and boiling-point curve - gas-liquid equilibrium curves (pressure constant) - almost lie on top of each other, and a multi-constituent refrigerant having this chemical characteristic incurs less composition changes even when evaporation (or condensation) as a phase change occurs. Consequently, even when refrigerant leaks from the gas phase somewhere in the piping installation, the composition of circulated refrigerant incurs less changes.

Therefore, R410A can be treated in almost a same manner as a mono-constituent refrigerant like R22 is treated. When actually charging R410A, however, do so from the liquid phase side by taking into account the phenomenon that, when put in a cylinder, the composition changes a little between gas and liquid phases.

c) Pressure characteristics

As shown in Table 2, since R410A's vapor pressure is about 1.6 times higher than that of R22 at the same temperature, perform installation/service with special tools and materials which are exclusive for R410A and can withstand high pressure.

Table 1. Comparison of thermophysical properties of R410A and R22

	R410A	R22
Composition (wt%)	R32/R125 (50/50)	R22 (100)
Molecular weight	72.6	86.5
Boiling point (°C)	-51.4	-40.8
Vapor pressure (25°C, MPa)	1.56	0.94
Saturated vapor density (25°C, kg/m^2)	64.0	44.4
Inflammability	Nonflammable	Nonflammable
Ozone depletion potential (ODP)	0	0.055
Global warming potential (GWP)	1730	1700

Source: List of thermophysical properties complied by the Japan society of refrigeration and air conditioning, NIST REFPROP V5.10, etc.

Table 2. Comparison of saturated vapor pressure of R410A and R22

unit: MPa

Refrigerant	R410A	R22
Temperature (°C)		
-20	0.30	0.14
0	0.70	0.40
20	1.35	0.81
40	2.32	1.43
60	3.73	2.33
65	4.15	2.60

Source: List of thermophysical properties complied by the Japan society of refrigeration and air conditioning, NIST REFPROP V5.10, etc.

(3) Lubricating oils for R410A

As the lubricating oils for R22, mineral oils, alkylbenze synthetic oils, etc. have so far been used. As R410A features less solubility with these conventional lubricating oils such as mineral oils, the lubricating oils tend to stay within the refrigeration cycle. As the lubricating oils highly soluble with R410A, ester, ethereal and other synthetic oils are available. However, as these synthetic oils are very hygroscopic, they must be treated even more carefully than the conventional lubricating oils. Furthermore, if these synthetic oils are mixed with mineral oils, alkylbenzene synthetic oils, etc., they may deteriorate, and block the capillary tubes, or cause the compressor to fail. So, never mix these synthetic oils.

7.1.2 Safety during installation/servicing

As R410A's pressure is about 1.6 times higher than that of R22, improper installation/servicing may cause a serious trouble. By using tools and materials exclusive for R410A, it is necessary to carry out installation/servicing safely while taking the following precautions into consideration.

1) Never use refrigerant other than R410A in an air conditioner which is designed to operate with R410A.
2) If a refrigeration gas leakage occurs during installation/servicing, be sure to ventilate fully.
   If the refrigerant gas comes into contact with fire, a poisonous gas may occur.
3) When installing or removing an air conditioner, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture or personal injury may be caused.
4) After completion of installation work, check to make sure that there is no refrigeration gas leakage.
   If the refrigerant gas leaks into the room, coming into contact with fire in the fan driven heater, space heater, etc., a poisonous gas may occur.
5) When an air conditioning system charged with a large volume of refrigerant (e.g.multi type air conditioner) is installed in a small room, it is necessary to exercise care so that, even when refrigerant leaks, its concentration does not exceed the marginal level.
   If the refrigerant gas leakage occurs and its concentration exceeds the marginal level, an oxygen starvation accident may result.
6) Be sure to carry out installation or removal according to the installation manual.
   Improper installation may cause refrigeration trouble, water leakage, electric shock, fire, etc.
7) Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician.
   Improper repair's may result in water leakage, electric shock and fire, etc.

7.2 Refrigerant piping installation

7.2.1 Piping materials and joints used

For the refrigerant piping installation, copper pipes and joints are mainly used. Copper pipes and joints suitable for the refrigerant must be chosen and installed. Furthermore, it is necessary to use clean copper pipes and joints whose interior surfaces are less affected by contaminants.

(1) Copper pipes

It is necessary to use seamless copper pipes which are made of either copper or copper alloy and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in Table 3. Never use copper pipes thinner than 0.8 mm even when it is available on the market.

Table 3. Thicknesses of annealed copper pipes

		Thickness (mm)	
Nominal diameter	Outer diameter (mm)	R410A	[ref.] R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80
1/2	12.70	0.80	0.80
5/8	15.88	1.00	1.00

(2) Joints

For copper pipes, flare joints or socket joints are used. Prior to use, be sure to remove all contaminants.

a) Flare joints

Flare joints used to connect the copper pipes cannot be used for pipings whose outer diameter exceeds 20 mm. In such a case, socket joints can be used.

Sizes of flare pipe ends, flare joint ends and flare nuts are as shown in Tables 5~8 (see on page 112, 113) below. Also, union, half union, Tee-type union and elbow-type union shapes are generally used (see Fig 1).

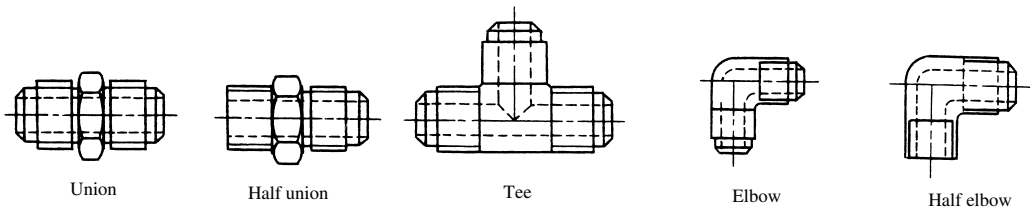


Fig.1 Flare joints

b) Socket joints

Socket joints are such that they are brazed for connections, and used mainly for thick pipings whose diameter is larger than 20 mm. Thicknesses of socket joints are as shown in Table 4. Socket, elbow-type and tee-type shapes are generally used (see Fig. 2).

Table 4.Minimum thicknesses of socket joints

Nominal diameter	Reference outer diameter of copper pipe jointed (mm)	Minimum joint thickness (mm)
1/4	6.35	0.50
3/8	9.52	0.60
1/2	12.70	0.70
5/8	15.88	0.80

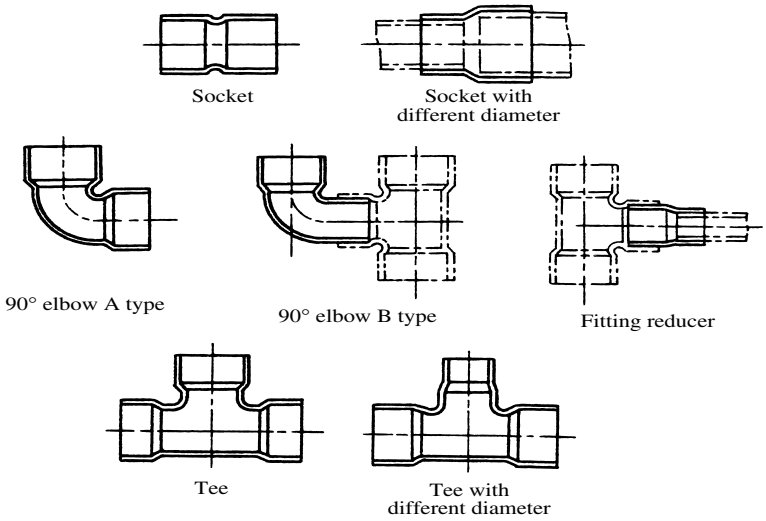


Fig.2 Socket joints

7.2.2 Processing of piping materials

When performing the refrigerant piping installation, care should be taken to ensure that water or dust does not enter the pipe interior, that no other oil other than lubricating oils used in the installed air conditioner is used, and that refrigerant does not leak. When using lubricating oils in the piping processing, use such lubricating oils whose water content has been removed. When stored, be sure to seal the container with an airtight cap or any other cover.

(1) Flare processing procedures and precautions

a) Cutting the pipe

By means of a pipe cutter, slowly cut the pipe so that it is not deformed.

b) Removing burrs and chips

If the flared section has chips or burrs, refrigerant leakage may occur. Carefully remove all burrs and clean the cut surface before installation.

c) Insertion of flare nut

d) Flare processing

Make certain that a clamp bar and copper pipe have been cleaned.

By means of the clamp bar, perform the flare processing correctly.

Use either a flare tool for R410A or conventional flare tool.

Flare processing dimensions differ according to the type of flare tool. Be careful. When using a conventional flare tool, be sure to secure “dimension A” by using a gage for size adjustment.

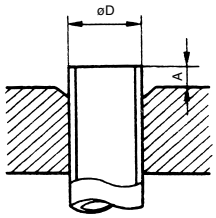


Fig.3 Flare processing dimensions

Table 5. Dimensions related to flare processing for R410A

Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R410A Clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0~0.5	1.0~1.5	1.5~2.0
3/8	9.52	0.8	0~0.5	1.0~1.5	1.5~2.0
1/2	12.70	0.8	0~0.5	1.0~1.5	2.0~2.5
5/8	15.88	1.0	0~0.5	1.0~1.5	2.0~2.5

Table 6. Dimensions related to flare processing for R22

Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R410A Clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0~0.5	0.5~1.0	1.0~1.5
3/8	9.52	0.8	0~0.5	0.5~1.0	1.0~1.5
1/2	12.70	0.8	0~0.5	0.5~1.0	1.5~2.0
5/8	15.88	1.0	0~0.5	0.5~1.0	1.5~2.0

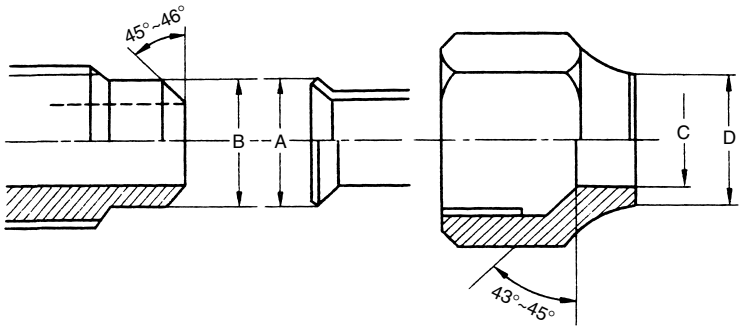


Fig.4 Relations between flare nut and flare seal surface

Table 7. Flare and flare nut dimensions for R410A

[unit: mm]

Nominal diameter	Outer diameter (mm)	Thickness (mm)	Dimension (mm)				Flare nut width
			A	B	C	D	
1/4	6.35	0.8	9.1	9.2	6.5	13	17
3/8	9.52	0.8	13.2	13.5	9.7	20	22
1/2	12.70	0.8	16.6	16.0	12.9	23	26
5/8	15.88	1.0	19.7	19.0	16.0	25	29

Table 8. Flare and flare nut dimensions for R22

[unit: mm]

Nominal diameter	Outer diameter (mm)	Thickness (mm)	Dimension (mm)				Flare nut width
			A	B	C	D	
1/4	6.35	0.8	9.0	9.2	6.5	13	17
3/8	9.52	0.8	13.0	13.5	9.7	20	22
1/2	12.70	0.8	16.2	16.0	12.9	20	24
5/8	15.88	1.0	19.4	19.0	16.0	23	27

(2) Flare connecting procedures and precautions

a) Make sure that the flare and union portions do not have any scar or dust, etc.

b) Correctly align the processed flare surface with the union axis.

c) Tighten the flare with designated torque by means of a torque wrench. The tightening torque for R410A is same as that for conventional R22. Incidentally, when the torque is weak, the gas leakage may occur. When it is strong, the flare nut may crack and may be made nonremovable. When choosing the tightening torque, comply with values designated by manufacturers. Table 9 shows reference values.

Note : When applying oil to the flare surface, be sure to use oil designated by the manufacturer. If any other oil is used, the lubricating oils may deteriorate and cause the compressor to burn out.

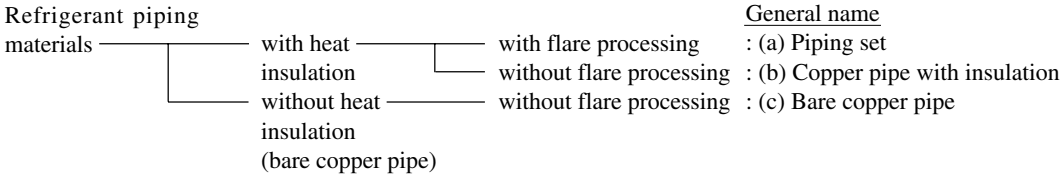
Table 9. Tightening torque of flare for R410A [Reference values]

Nominal diameter	Outer diameter (mm)	Tightening torque N·m (kgf·cm)	Tightening torque of torque wrenches available on the market N·m (kgf·cm)
1/4	6.35	14~18 (140~180)	16 (160), 18 (180)
3/8	9.52	33~42 (330~420)	42 (420)
1/2	12.70	50~62 (500~620)	55 (550)
5/8	15.88	63~77 (630~770)	65 (650)

7.2.3 Storage of piping materials

(1) Types and storage of piping materials

Refrigerant piping materials for air conditioners are broadly classified into the following types.



As R410A features pressure about 1.6 times higher than R22, it is necessary to use a copper pipe which has a thickness stated in Table 3 (see on page 110) and which contains less contaminants. It is necessary to carefully treat/store copper pipes so that they are not collapsed, deformed or damaged. Due care must also be exercised so that foreign matters such as dust and water do not enter the pipe interior.

A piping set's open end is sealed with a cap, etc. When storing it, make sure that it is sealed securely. When storing a cladded copper pipe or bare copper pipe, securely seal the opening with pinching, taping, etc.

(2) Identification

a) Piping set

A copper pipe as piping set for R410A must have a thickness as stated in Table 3 (see on page 110), and, as shown in Tables 5 and 6 (see on page 112), it also differs from R22 in flare processing and flare nut dimensions. So, it is necessary to choose a piping set suitable for R410A.

b) Copper pipe with insulation

Before using a copper pipe with insulation, make sure that it has a thickness designated for R410A.

c) Bare copper pipe

It is necessary to use a bare copper pipe which has a thickness designated in Table 3 (see on page 110) and contains less contaminants. As the bare copper pipe surface is naked, it is necessary to treat it with exceeding care and adopt a means for identification to prevent improper usage by making it easily discriminable from other piping materials.

(3) Precautions before installation

Observe the following precautions when performing the piping connection at the site.

a) Keep any open ends of pipes be sealed with a cap, etc. until connected with the equipment.

b) Exercise great care when performing piping installation on a rainy day.

When water enters into the piping, the lubricating oil may deteriorate and cause the equipment to fail.

c) Carry out the piping connection in as short a time as possible.

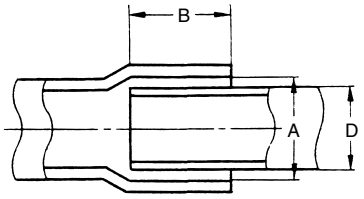
If the piping is left open for a long period, fully purge the interior with nitrogen gas or dry it with a vacuum pump.

7.2.4 Brazing

(1) Processing the connected parts

As brazing is molten between the joined surfaces to yield high adhesive strength, it is necessary to secure a wide enough space to be joined and also an adequate clearance between the joined surfaces. Copper pipe joints' minimum insertion depths, outer pipe diameters and clearances between outer and inner pipe diameters are as shown in Table 10. In the case of bronze brazing filler, when the clearance is about 0.05~0.1mm, the pipes can be connected most strongly.

Table 10. Copper pipe joints' minimum insertion depths and clearances



Outer pipe diameter D (mm)	Minimum insertion depth B (mm)	Clearance (A-D) × 1/2 (mm)
5~8	6	0.05~0.35
8~12	7	0.05~0.35
12~16	8	0.05~0.45

* When joining the pipes, either the pipe ends are processed, or pipes are connected by brazing with a socket joint.

(2) Brazing filler metal

a) Alloy brazing filler

An alloy mainly composed of silver and copper is used to join iron, copper or copper alloy. Although it excels in solderability, it is relatively expensive.

b) Phosphor bronze brazing filler

Phosphor bronze brazing filler is generally used to join copper or copper alloy.

c) Low temperature solder

An alloy of tin and lead. An ordinary type of solder. Since it is weak in adhesive strength, it should not be used for refrigerant pipe brazing.

* Cautions:

1) BCuP tends to react with sulphur and produce a fragile compound water solution, which may cause a gas leakage. So, use any other type of brazing filler at a hot spring resort, etc., and coat the surface with a paint.

2) When performing brazing again at the time of servicing, use the same type of brazing filler.

(3) Flux

a) Reasons for the use of flux

- By removing the oxide film and any foreign matter on the metal surface, it assists the flow of brazing filler.
- In the brazing process, it prevents the metal surface from being oxidized.
- By reducing the brazing filler's surface tension, the brazing filler adheres better to the treated metal.

b) Properties required for flux

- Temperature at which flux is active coincides with the brazing temperature.
- Due to a wide effective temperature range, flux is hard to carbonize.
- It is easy to remove slag after brazing.
- The corrosive action to the treated metal and brazing filler is negligible.
- Excels in coating performance and is harmless to the human body.

As the flux works in a complicated manner as described above, it is necessary to choose an adequate type of flux according to the type and shape of treated metal, type of brazing filler and brazing method, etc.

c) Types of flux

- Incorruptible flux

  Generally, it is a compound of borax and boric acid.

  Effective in cases where the brazing temperature is higher than 800°C.

- Activated flux

  Most of fluxes generally used for silver brazing fall under this type.

  It features an increased oxide film removing capability due to the addition of compounds such as potassium fluoride, potassium chloride and sodium fluoride, to the borax-boric acid compound.

  * Cautions:

  ① Remove the flux after brazing.

  ② When chlorine contained in the flux stays within the pipe, the lubricating oil deteriorates. So, use a flux which does not contain chlorine.

  ③ When adding water to the flux, use water which does not contain chlorine (e.g. distilled water or ion-exchange water).

(4) Brazing

As brazing requires sophisticated techniques and experiences, it must be performed by a qualified person.

In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry nitrogen gas (N_2) flow.

<Brazing method for preventing oxidation>

a) Attach a reducing valve to the nitrogen gas cylinder

b) Use a copper pipe to direct the nitrogen gas into the piping, and attach a flowmeter to the nitrogen gas cylinder.

c) Apply a seal onto the clearance between the piping and inserted pipe for the nitrogen gas in order to prevent the nitrogen gas from flowing backward.

d) When the nitrogen gas is flowing, be sure to keep the piping end open.

e) Adjust the flow rate of nitrogen gas so that it is lower than 0.05m^3/h, or 0.02MPa (0.2kgf/cm^2) by means of the reducing valve.

f) After taking the steps above, keep the nitrogen gas flowing until the piping cools down to a certain extent (i.e. temperature at which pipes are touchable with finger).

g) Completely remove the flux after brazing.

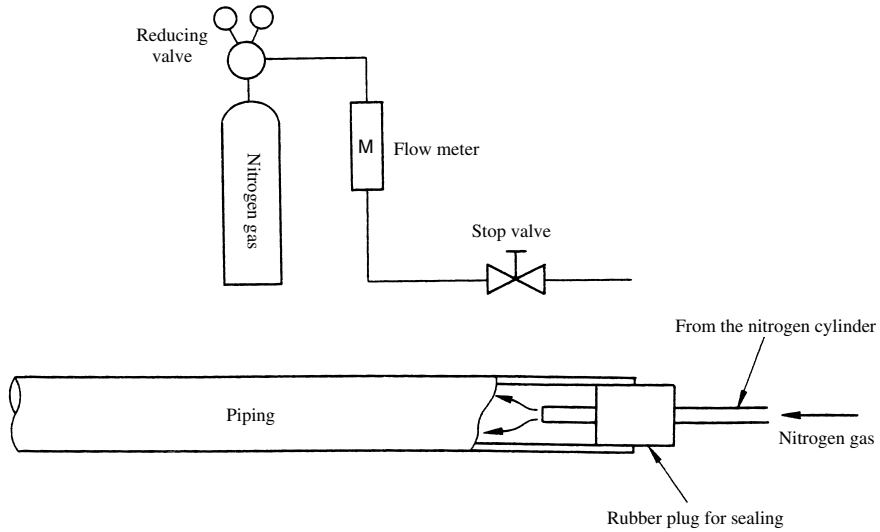


Fig.5 Prevention of oxidation during brazing

* Cautions during brazing

① General cautions

1) The brazing strength should be high as required.
2) After operation, airtightness should be kept under a pressurized condition.
3) During brazing do not allow component materials to become damaged due to overheating.
4) The refrigerant pipe work should not be come blocked with scale or flux.
5) The brazed part should not restrict the flow in the refrigerant circuit.
6) No corrosion should occur from the brazed part.

② Prevention of overheating

Due to heating, the interior and exterior surfaces of treated metal may oxidize. Especially, when the interior of the refrigerant circuit oxidizes due to overheating, scale occurs and stays in the circuit as dust, thus exerting a fatally adverse effect. So, make brazing at adequate brazing temperature and with a minimum of heating area.

③ Overheating protection

In order to prevent components near the brazed part from overheating damage or quality deterioration due to flame or heat, take adequate steps for protection such as (1) by shielding with a metal plate, (2) by using a wet cloth, and (3) by means of heat absorbent.

④ Movement during brazing

Eliminate all vibration during brazing to protect brazed joints from cracking and breakage.

⑤ Oxidation preventive

In order to improve the brazing efficiency, various types of antioxidant are available on the market. However, the constituents of these are widely varied, and some are anticipated to corrode the piping materials, or adversely affect HFC refrigerant, lubricating oil, etc. Exercise care when using an oxidation preventive.

7.3 Installation, removal and servicing

7.3.1 Tools for R410A

In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged accidentally, the service port diameter of the outdoor unit control valve (3-way valve) has been changed. Also, to increase the pressure resisting strength, flare processing dimensions and sizes of opposite sides of flare nuts (for copper pipes with nominal diameters 1/2 and 5/8) have been changed. During installation/service, therefore, prepare tools exclusive for R410A shown in (1) on page 117 and general tools shown in (2) on page 118.

(1) Tools exclusive for R410A

a) Gauge manifold

- As R410A is characterized by high pressure, conventional tools cannot be used.

Table 11. Differences between conventional high/low pressure gauges and those for R410A

	Conventional gauges	Gauges exclusive for R410A
High pressure gauge (red)	-0.1~3.5MPa -76 cmHg~35 kgf/cm^2	-0.1~5.3MPa -76 cmHg~53 kgf/cm^2
Compound gauge (blue)	-0.1~1.7MPa -76 cmHg~17 kgf/cm^2	-0.1~3.8MPa -76 cmHg~38 kgf/cm^2

- In order to prevent any other refrigerant from being charged accidentally, each port of the manifold has been changed in shape.

Table 12. Differences in port size between conventional manifold and that for R410A

	Conventional manifold	Manifold for R410A
Port size	7/16 UNF 20 threads per inch	1/2 UNF 20 threads per inch

b) Charge hose

- As R410A is characterized by high pressure, the pressure resistance of the charge hose has been increased. The material has also been changed to an HFC resistant type, and, as in the case of each port of the manifold, the hose cap size has been changed. Furthermore, for prevention of gas pressure reaction, a charge hose with a valve placed near the cap is also available.

Table 13. Differences between conventional charge hose and that for R410A

		Conventional charge hose	Charge hose for R410A
Pressure resistance	Normal pressure	3.4 MPa (34 kgf/cm^2)	5.1 MPa (51 kgf/cm^2)
	Breaking pressure	17.2 MPa (172 kgf/cm^2)	27.4 MPa (274 kgf/cm^2)
Engineering material		NBR rubber	HNBR rubber internally coated with nylon
Cap size		7/16 UNF 20 threads per inch	1/2 UNF 20 threads per inch

c) Electronic balance for refrigerant charging

- As R410A belonging to the HFCs features high pressure and high evaporating speed, when R410A is charged by using a charging cylinder, R410A in the cylinder cannot be kept in a liquefied state and gasified refrigerant bubbles in the charging cylinder, it becomes difficult to read values. Therefore, it is advisable to adequately use an electronic balance for refrigerant charging.
- An electronic balance for refrigerant charging has higher strength due to its structure with four points of support for refrigerant cylinder weight detection. As the charge hose connecting part has two ports-one for R22 (7/16 UNF 20 threads per inch) and the other for R410A (1/2 UNF 20 threads per inch) - it can also be used for charging the conventional refrigerant.
- Two types of electronic balance for refrigerant charging are available - one for 10kg cylinder and the other for 20kg cylinder.
  Electronic balance for 10kg cylinder ..... precision ± 2g
  Electronic balance for 20kg cylinder ..... precision ± 5g
- Refrigerant is charged manually by opening/closing the valve.

d) Torque wrench (for nominal diameters 1/2 and 5/8)

- Along with changes in flare nut sizes for enhanced pressure resisting strength, torque wrenches for R410A differ in opposite side size.

Table 14. Differences between conventional wrenches and those for R410A

	Conventional torque wrench	Torque wrench for R410A
For 1/2 (opposite side × torque)	24mm × 55N·m (550 kgf·cm)	26mm × 55N·m (550 kgf·cm)
For 5/8 (opposite side × torque)	27mm × 65N·m (650 kgf·cm)	29mm × 65N·m (650 kgf·cm)

e) Flare tool (clutch type)

- A flare tool for R410A is provided with a large clamp bar receiving hole so that the projection of the copper pipe from the clamp bar can be set at 0~0.5 mm in flare processing, and also features higher spring strength for increased expansion pipe torque. This flare tool can also be used for R22 copper pipe.

f) Gauge for projection adjustment (used when flare processing is made by using conventional flare tool [clutch type])

- A gauge 1.0 mm in thickness which helps in easily setting the projection of the copper pipe from the clamp bar at 1.0~1.5 mm.

g) Vacuum pump adapter

- It is necessary to use an adapter for preventing vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports - one for conventional refrigerant (7/16 UNF 20 threads per inch) and the other for R410A. If the vacuum pump oil (mineral) mixes with R410A, a sludge may occur and damage the equipment.

h) Refrigerant cylinder

- A refrigerant cylinder exclusive for R410A comes identified with refrigerant name and is coated with pink paint as designated by the ARI, U.S.A.

i) Charge port and packing for refrigerant cylinder

- According to the charge hose's cap size, a charge port with 1/2 UNF 20 threads per inch and corresponding packing are required.

j) Gas leakage detector

- A high sensitivity gas leakage detector exclusive for HFC refrigerant is used. In the case of R410A, the detection sensitivity is about 23g per year.

(2) General tools

a) Vacuum pump

b) Torque wrench

for 1/4: opposite side 17 mm × (16 N·m) (160 kgf·cm)

for 1/4: opposite side 17 mm × (18 N·m) (180 kgf·cm)

for 3/8: opposite side 22 mm × (42 N·m) (420 kgf·cm)

c) Pipe cutter

d) Reamer

e) Screwdriver (+, -)

f) Hacksaw

g) Hole core drill (ø65 or 70)

h) Hexagonal wrench (opposite side 4 or 5 mm)

i) Spanner, or monkey wrench

j) Tape measure

k) Thermometer

l) Clamping ampere meter

m) Insulation resistance tester (mega tester)

n) Electro circuit tester

o) Pipe bender

(3) Applicability of R410A tools to R22 model

Table 15. Applicability of R410A tools to R22 model

	Tools for R410A	Applicable to R22 model
a)	Gauge manifold	×
b)	Charge hose	×
c)	Electronic balance for refrigerant charging	○
d)	Torque wrench (nominal diameter 1/2, 5/8)	×
e)	Flare tool (clutch type)	○
f)	Gauge for projection adjustment*	○
g)	Vacuum pump adapter	○
h)	Refrigerant cylinder	×
i)	Charge port and packing for refrigerant cylinder	×
j)	Gas leakage detector	×

* Used when conventional flare tool (clutch type) is used.

Note: For inquiry, contact your agent.

7.3.2 New installation work (when using new refrigerant piping)

(1) Air purge by vacuum pump and gas leakage inspection (see Fig. 6)

a) Connect the charge hose to the outdoor unit. ①

b) Connect the charge hose to the vacuum pump adapter. ②
At this time, keep the control valves in the fully closed position. ③ ④

c) Place the handle *Lo* in the fully opened position ⑤, and turn on the vacuum pump's power switch.
During this step, perform evacuating (about 10 ~ 15 minutes); for the evacuating time, refer to the equipment manufacturer's manual.

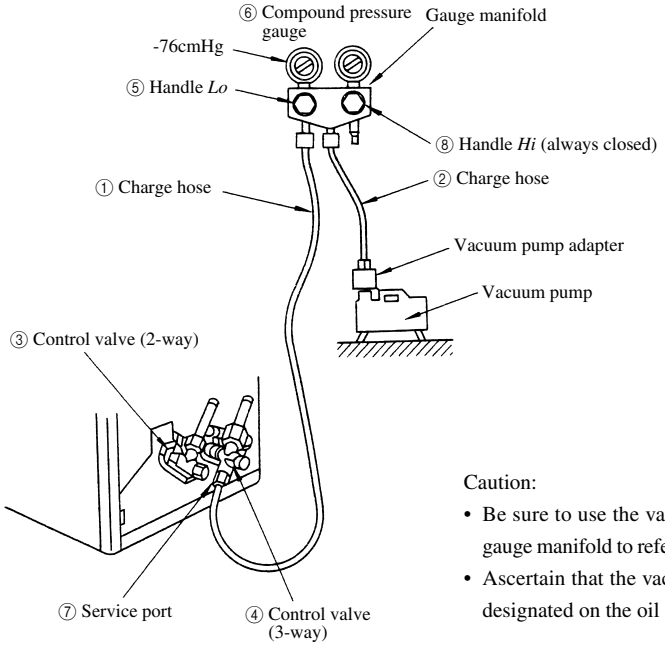
d) When the compound gauge's pointer has indicated -0.1 MPa (-76 cmHg) ⑥, place the handle *Lo* in the fully closed position ⑤, and turn OFF the vacuum pump's power switch
Keep this state for 1~2 minutes, and ascertain that the compound gauge's pointer does not return.

e) Fully open the control valves. ③ ④

f) Detach the charge hoses. ① ②

g) Tightly secure the cap on the service port. ⑦

h) After securing the caps on the control valves, check the caps' periphery if there is any gas leakage. ③ ④ ⑦



Caution:

- Be sure to use the vacuum pump, vacuum pump adapter and gauge manifold to refer to their instruction manuals beforehand.
- Ascertain that the vacuum pump is filled with oil to the level designated on the oil gauge.

Fig.6 Configuration of air purge by vacuum pump

(2) Additional refrigerant charging required for refrigerant piping length longer than standard length (The following steps should be taken following the step e) in (1) above. See Fig. 7)

a) Set the refrigerant cylinder to the electronic balance, and connect the connecting hoses on the cylinder and electronic balance's connecting port.
* Caution:
Be sure to make setting so that liquid can be charged. When using a cylinder equipped with a siphon, liquid can be charged without turning it upside down.

b) Connect the gauge manifold's charge hose to the electronic balance's connecting port. ③ ②

c) Open the refrigerant cylinder's valve, and, after opening the charging valve a little, close it. ① ②

d) After making zero (0) adjustment, open the charging valve and, by opening the gauge manifold's valve *Lo*, charge the liquid refrigerant. ② ⑤
(Before handling the electronic balance, refer to its instruction manual).

e) When the designated amount of refrigerant could not be charged, make additional charging bit by bit by cooling operation (for the amount of each addition, follow the instruction manual prepared by the equipment manufacturer). If the first additional charging was not enough, make the second additional charging after about one minute in the same manner as the first additional charging.
* Caution:
Be sure never to charge a large amount of liquid refrigerant at once to the unit in cooling mode, since liquid is charged from the gas side.

f) After charging liquid refrigerant into the air conditioner by closing the charging valve, stop operation by fully closing the gauge manifold's valve *Lo*. ② ⑤

g) Quickly remove the charge hose from the service port. ⑥
When stopped halfway, refrigerant being cycled will be released.

h) After securing the caps on the service port and control valve, check the caps' periphery to see if there is any gas leakage. ⑥ ⑦

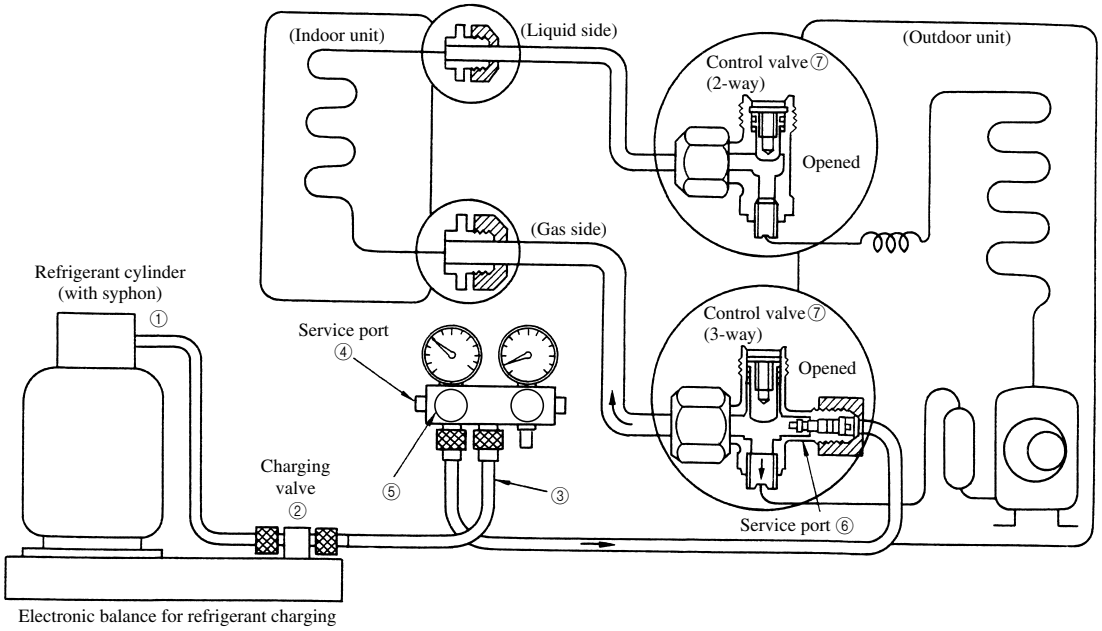


Fig.7 Configuration of additional refrigerant charging

7.3.3 Removal (When using new refrigerant piping)

(1) Removing the unit

a) Recovery of refrigerant from the outdoor unit by pump down
- At the time of pump down, use a gauge manifold exclusive for R410A.
- Operating the unit in forced cooling mode, recover refrigerant from the outdoor unit.
  (For details of reclaiming steps and precautions, see the instruction manual prepared by the equipment manufacturer)
  * Caution:
    In the case of an outdoor unit which is incapable of pump down, use a refrigerant recovery unit.

b) Removing the indoor/outdoor units
- Remove the piping and wiring between the indoor and outdoor units.
- Tighten the outdoor unit's control valves and service port with the specified torque.
- Tighten the capped flare nuts at the indoor/outdoor units connecting part with the specified torque.
- Remove the indoor/outdoor units.
  * Caution:
    When storing the indoor unit piping in its original position, be careful not to break the piping.

(2) Installing the unit

a) Proceed with the installation following the steps described in "7.3.2 New installation work".

7.3.4 Replacing the unit (Never use the existing refrigerant piping)

Use a brand-new refrigerant piping (1) when replacing the air conditioner using the conventional refrigerant (R22) with an air conditioner using the alternative refrigerant (R410A) or (2) even when replacing the air conditioner using the alternative refrigerant (R410A) with another air conditioner using R410A, as a problem may occur due to differences in pressure characteristics of refrigerant or differences in type of lubricating oil (air conditioners using R410A do not always use the same type of the lubricating oils).

7.3.5 Retrofitting

Do not operate the air conditioner which has used the conventional refrigerant (R22) by charging the alternative refrigerant (R410A). Otherwise, the equipment may cease to function normally and go wrong, or even cause serious problems such as rupture of the refrigeration cycle.

7.3.6 Refrigerant recharging at servicing

When it becomes necessary to recharge refrigerant, charge the specified amount of new refrigerant according to the following steps.

(For details, see the instruction manual prepared by the equipment manufacturer)

1) Connect the charge hose to the outdoor unit's service port.
2) Connect the charge hose to the vacuum pump adapter. At this time, keep the control valves in the fully opened position.
3) Place the handle *Lo* in the fully opened position, and turn ON the vacuum pump's power source. (For the evacuating time, refer to the equipment manufacturer's manual)
4) When the compound gauge's pointer has indicated -0.1 MPa (-76 cmHg), place the handle *Lo* in the fully closed position, and turn OFF the vacuum pump's power source. Keep this state for 1 ~ 2 minutes, and ascertain that the compound gauge's pointer does not return.
5) Charge liquid refrigerant by using the electronic balance according to the steps described in Section 7.3.2 (2) (pages119~120).

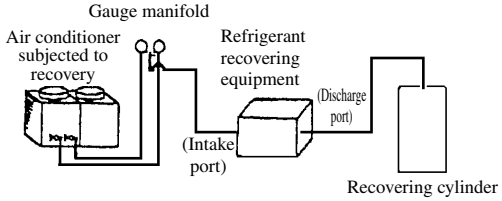
7.4 Refrigerant recovery

7.4.1 Recovering procedures

The following procedures for refrigerant recovery represent general procedures, and they may differ between actual cases depending upon the type of refrigerant recovering equipment. The connecting and handling methods for different type of refrigerant recovering equipment may also differ. So, ascertain the details by referring to the respective instruction manuals, etc.

(1) Checks prior to recovering procedures
   a) Checking the refrigerant recovering equipment
      ① Gas leakage [If there is any malfunction, repair it].
      ② Oil separator [Drain the residual oil].
      ③ Recovering equipment weighing function, overcharge preventing function (float switch), moisture indicator, drier and other accessory functions [should be adjusted or replaced where necessary].
      ④ Electrical circuit
   b) Checking the accessories to the refrigerant recovering equipment

(2) Preparations for recovering procedures
   a) Installation of refrigerant recovering equipment
      Install the equipment in a place which satisfies the following requirements as much as possible.
      ① Ambient temperature is higher than 0°C and lower than 40°C.
      ② A flat and dry floor.
      ③ A place as close to the air conditioner as possible.
   b) Preparation of recovering cylinder
      A recovering cylinder should be such that it does not go against prohibitions, and is suitable for refrigerant recovered.
   c) Connect to the power source
   d) Preparations for air conditioner subjected to refrigerant recovery
      ① When it is possible to run the air conditioner subjected to refrigerant recovery, perform pump down operation so that refrigerant is contained in the outdoor unit (condenser side).
         • Carry out the pump down operation after confirming the specification of the air conditioner subjected to refrigerant recovery.
      ② If there is any clogging part (ex. the electronic expansion valve, etc.), fully open such part.



(3) Connection of refrigerant recovering equipment
   a) Connect the air conditioner subjected to refrigerant recovery to the refrigerant recovering equipment.
      ① When there is a service port (port for recovery):
      Make connection to the service port (port for recovery) by using a gauge manifold and charge hose.
      ② When there is no service port (port for recovery):
      Make connection in a manner similar to ① above by using a piercing valve.
   b) Connect the refrigerant recovering equipment to the recovering cylinder.

(4) Recovering procedures

a) According to the instructions for handling the refrigerant recovering equipment (described in the attached instruction manual), operate the equipment to recover refrigerant.

b) During the operation, take care of the following cautions.

① Ascertain that the refrigerant recovering equipment is running as required and always monitor the state of operation so that adequate steps can be taken in an emergency.

② During the operation, remain at work site to ensure safety.

③ If you have to leave your work site for any unavoidable reason, stop the operation after ascertaining that the recovering cylinder is not overcharged.

c) During the operation, if the refrigerant recovering equipment's overcharging prevention mechanism operates and the equipment stops automatically, replace the recovering cylinder with an empty one.

d) If the pressure gauge's reading increases after a short time from the accomplishment of recovery and automatic stoppage of the refrigerant recovering equipment, restart the equipment and, if it stops again, finish the recovery.

(5) Procedures after recovery

a) Close the valves on the air conditioner subjected to refrigerant recovery, the refrigerant recovering equipment and the recovering cylinder.

b) Detach the recovering cylinder charged with refrigerant and store it as required by law.

7.4.2 Accessories/tools

In order to carry out R410A recovery, a variety of accessories/tools are required.

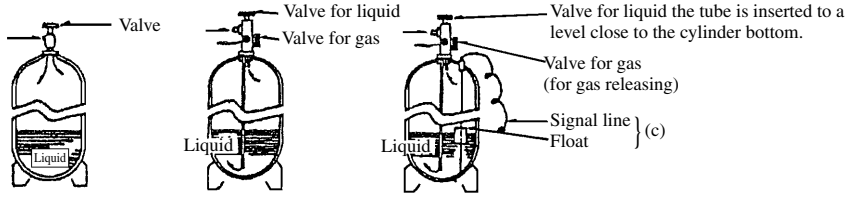
Shown below are standard accessories.

(1) Recovering cylinder

- Use a recovering cylinder designated by the equipment manufacturer.
- A detachable cylinder must be such that it complies with the laws and regulations concerned.
- Do not use an ordinary cylinder as a recovering cylinder.

  Note 1: A cylinder available when R410A was purchased, is a borrowed one.

  Note 2: As a cylinder available when R410A was purchased, is provided with a check valve, it cannot be used as a recovering cylinder.
- Types (by function)



(a) Basic type
- 1-port valve
- Can be used for R410A recovery.
- Inverted when delivering liquid R410A.

(b) 2-port valve type
- Capable of delivering liquid R410A or releasing gas in the upright position.
- Convenient for servicing.

(c) Float type special cylinder
- With a built-in float (signal) for prevention of overcharging

Fig.8 Cylinder types

- Caution

  It is prohibited by law to recover R410A into a throw-away service can or one-way cylinder.

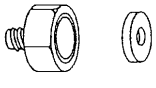
(2) Drier

- A desiccant container for removing the water content of R410A.
- A drier should be prepared as expendables.
- Keep the drier sealed just before fitting it.
- Required to protect the R410A recovering equipment.

(3) Connection hose

a) Charge port and charge port packing

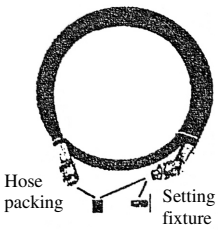
- Usually, it is sold independently of a refrigerant cylinder.
- In the case of a two-port cylinder, the diameter may be special. Inquire the manufacture for confirmation.
- A packing is expendables.



Charge port

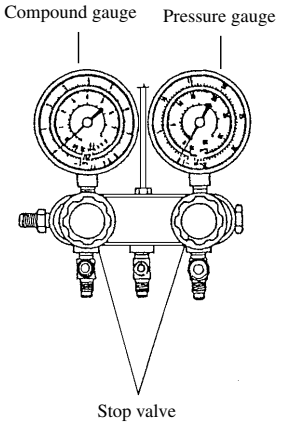
b) Charge hose (pressure resistant hose for fluorocarbon) and packing

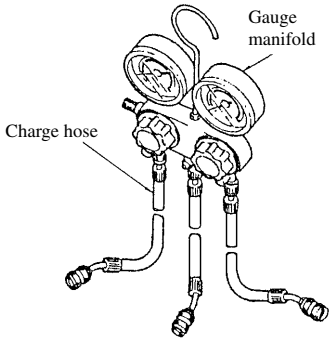
- It is 1/4B in thickness and available in various lengths, etc.
- Use a hose whose pressure resisting performance is higher than 5.2 MPa (52 kg/cm^{2}G).
- Generally, a setting fixture is provided only on one end.



(4) Gauge manifold

- The most important service tool for refrigeration and air conditioner.
- Widely used when charging/recovering R410A while checking gas pressure.



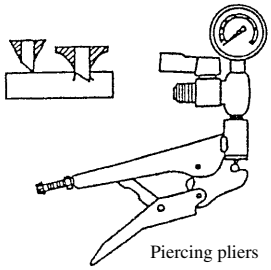


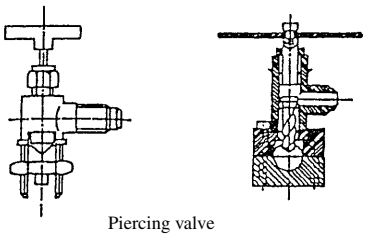
(5) Tube piercing valve

a) A tool used to make a hole for recovery in the copper pipe when recovering R410A from equipment which has no port for charging or recovering gas. Various types are available on the market and given various names.

b) As the piercing edge tends to wear, it is necessary to treat this valve as semi-expendables.

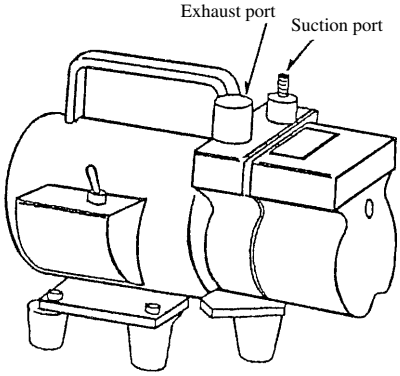
c) As vacuum rises, air tends to be inhaled from the hole. So, care must be exercised.





(6) Vacuum pump

Used to evacuate the recovering equipment and recovering cylinder.



MEMO

INVERTER MULTI-SPLIT SYSTEM ROOM AIR-CONDITIONER

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